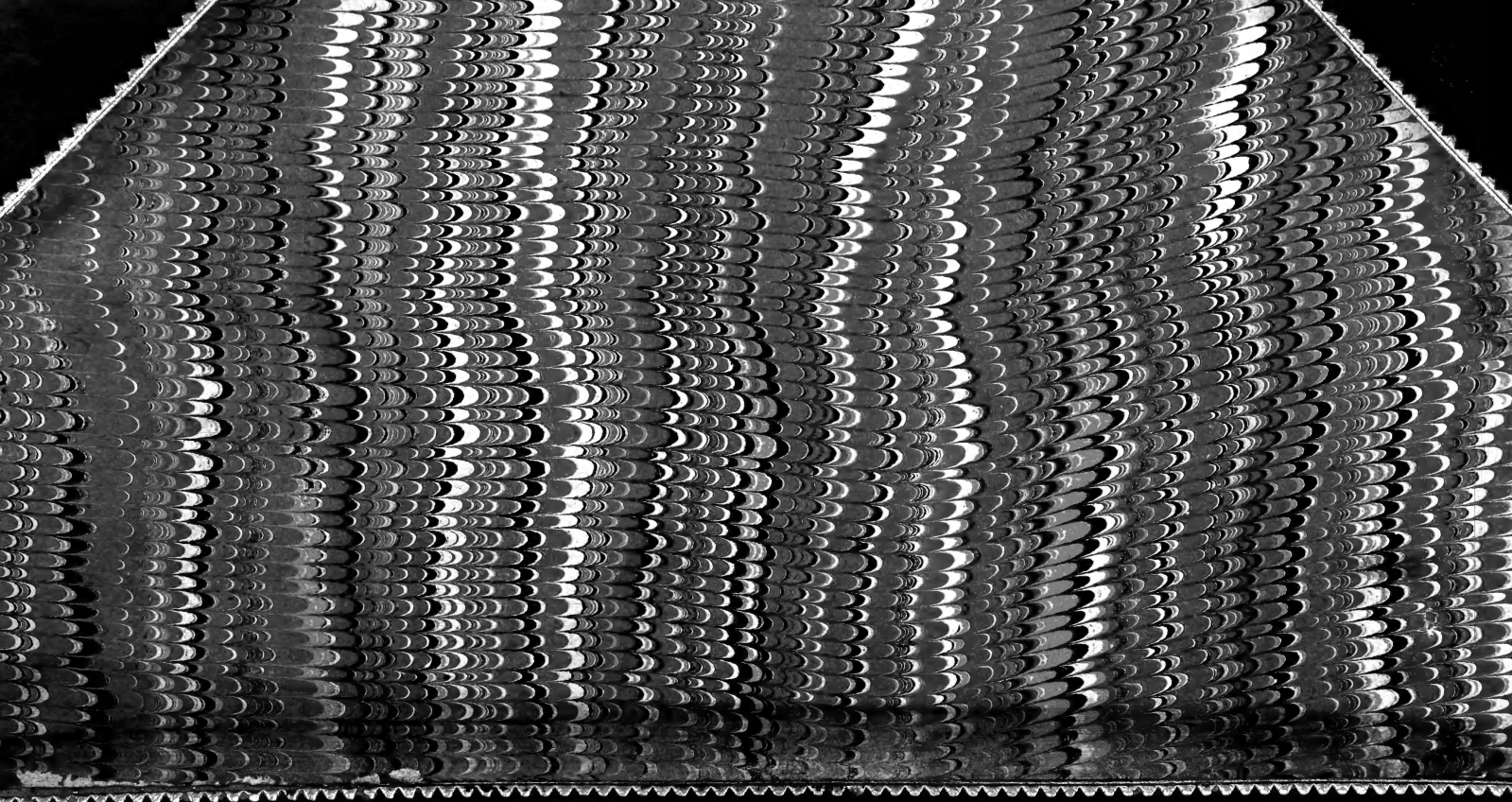

THE ZOOLOGIST FOR 1855.

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THE

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A

POPULAR MISCELLANY

OF

NATURAL HISTORY.

CONDUCTED BY

EDWARD NEWMAN, F.L.S., Memb. Imp. L.-C. Acad.

VOLUME THE THIRTEENTH.

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.LV.

"Que de charmes, que d'idées douces, agréables nous présente l'Histoire Naturelle! Que d'objets variés, interessans! Quelle source inépuisable d'observations, de recherches, et d'instruction pour celui qui se sent un goût decidé pour cette vaste science!"—DAUDIN.

CONTENTS.

The Roman numerals in the following Lists refer to the Appendix.

ALPHABETICAL LIST OF CONTRIBUTORS.

ALPHABETICAL LIST OF SUBJECTS.

ADVERTISEMENT.

The 'ZOOLOGIST' will be continued both as a Monthly and an Annual Publication. As a Monthly, it will contain thirty-two pages of letter-press, occasionally accompanied with illustrations engraved on wood; will be on sale two days before the end of every month; and will be charged One Shilling. As an Annual, it will be sold on or about the 1st of December; will contain twelve Monthly Numbers, bound and lettered uniformly with the present Volume; and will be charged Thirteen Shillings. An Alphabetical List, both of Contributors and Contents, will be published once in the year.

THE ZOOLOGIST

FOR 1855.

Memoranda of Observations made in small Aquaria, in which the Balance between the Animal and Vegetable Organisms was permanently maintained. By ROBERT WARINGTON, Esq.*

Fresh Water. Memorandum 1.—In my communication, dated September, 1852,† I gave a detailed account of my observations on the thread or web which some species of the fresh-water snail form to effect or facilitate their passage from one spot or object to another, and thus either ascending or descending by its means; and the instances noticed up to that period had reference only to the varieties of the Limneæ. In continuation of my observations on the same subject, I have now to state that the varieties of Planorbis, as also Neritina fluviatilis and Physa fontinalis, have, since that date, been noticed to possess the same power; and in the case of the latter, Physa fontinalis, the thread or web was so tough and strong, that on one occasion I was able, by means of a small rod introduced between the creature and its point of attachment, to move it out of its straight course a considerable distance, and, by then slowly drawing the rod upwards, I succeeded in raising the snail completely out of the water a space of about seven inches, suspended by its thread, so that, under these circumstances, the thread itself became distinctly visible.

From the observations which I have been enabled to make, I consider that I am justified in stating that all the fresh-water snails are possessed of this power.

* Read at the Liverpool Meeting of the British Association, and communicated by the author.

† Published in the 'Zoologist' for 1852, p. 3633.

Memorandum 2.—As an evidence of the permanency of the balance capable of being established between the animal and vegetable organisms by the introduction of the water-snail or other phytophagous mollusk, as I have elsewhere described,* I may state that the same water in which my original experiments were made in March, 1849, has been in continual use up to the present time, several fish living constantly in it, without disturbance, and that it is now as bright and in as healthy a state as at the first period of its being employed.

Again, in a small jar of about one pint capacity, having a single plant of Vallisneria spiralis growing healthily in it, and with a few small water-snails as scavengers, I succeeded, during the spring of 1853, in hatching and rearing a young trout. The egg was obtained from Mr. S. Gurney, jun., and had been removed from his preserves in the river Wandle; the shell ruptured the day after my receiving it, and it was maintained in a perfectly healthy state during the whole of the period required for the development of the respiratory organs, and the complete though gradual absorption of the ovum. This development was perfected in fifteen days from the bursting of the shell, till the period that the fish could sustain itself contiuously in the water and was able to swim strongly. Having arrived at this stage of maturity, the vessel became far too small for the free use of its active powers of locomotion, and it was therefore transferred to a small tank containing several minnows, when, to my great annoyance, it was immediately seized and devoured.

As another instance of the voracity of the finny tribe and their destruction of each other, I may mention here that I had on a previous occasion placed several small trout fry over-night in an aquarium containing some gold-fish, but they must have been rapidly preyed upon, as no trace could be seen of them the following morning. These facts will demonstrate clearly the havoc which must take place in the rivers and streams among the young fry of various fish under ordinary circumstances, when they are proved to be devoured with such extraordinary rapidity even by such species as the gold-fish or carp tribe and the minnow.

Memorandum 3.—Care should be taken in the aquarium for fresh water to exclude the ordinary polype or Hydra fusca, particularly where certain species of fish are to be preserved, as with the minnow (*Leuciscus Phoxinus*), for these creatures, insignificant as they may appear, after a short time cause their death, and that under most

* Published in the 'Zoologist' for 1850, p. 2868.

extraordinary circumstances, as the following observations will tend to show:—In a small aquarium that had had gold-fish kept in it for a length of time, but which had been removed into one of larger dimensions and more fully exposed to the light, an enormous number of the Hydra fusca were observed to have made their appearance very soon after this removal. Wishing therefore to ascertain if the appearance and rapid increase of these polypes had been prevented by the gold-fish, the following experiments were made:—Fifteen individuals of the Hydra fusca were placed in the aquarium containing the gold-fish, but they very soon disappeared, having, I presume, been devoured by the fish; a second fifteen were then introduced, but with the same result. At the same time as this experiment was made, fifteen Hydras were placed in a tank containing four minnows (*Leuciscus Phoxinus*) and a pair of small eels, but as the minnows did not appear to touch them, the same number of polypes being counted over several times during a period of three weeks, they were soon forgotten altogether. After a space of about seven months had elapsed from this time, the minnows were observed to assume a most extraordinary aspect, the head appeared very much swollen, and the eyes of all of them looked as though starting out of their heads, being forced upwards and in an outward direction and much enlarged; by degrees the gills of some of them became streaked with bloody markings, and this gradually extended to the base of the pectoral fins. The whole appearance was most distressing to contemplate, particularly as it was impossible, from ignorance of the cause, to adopt any remedial measures. Judging from their appearance my impression was that they had been poisoned, and, assuming that it must have arisen from something putrescent which they might have raked out of the materials at the bottom of the aquarium, the whole of the water was drawn off clear by a syphon, the gravel and sand thoroughly washed, and everything replaced in the tank with the fish; no improvement, however, appeared to follow, the fish got worse and ultimately died. This was in June, 1853. Before this extraordinary change came on, the fish had been observed to cluster together in one particular secluded spot, and rarely came out as they had been accustomed to do, and when they did venture forth they rubbed or jerked themselves with much force against the gravel and rock-work, as though something was irritating the skin: nothing, however, was visible. I had had these fish for about eighteen months in the same aquarium. As the water was perfectly bright and clear, and free from all odour or unpleasant taste, I procured six fresh minnows and placed them in

the tank; for about ten days they appeared to be pretty healthy: they did not, however, swim about freely, but herded together in one corner of the aquarium, and then the same extraordinary change gradually came on which had been observed in the others, and after lingering for seventeen days they all died. On carefully scrutinizing the different parts of the tank with a magnifying glass, my attention was at once arrested by observing the enormous number of the Hydra fusca which were present, particularly on the parts of the aquarium where the fish had been accustomed to feed; that is, along the water-line towards the light, at the base of the plants of Vallisneria spiralis, about half-an-inch above the gravel, and on the whole of the rock-work around the space where the minnows delighted to hide: here they might have been seen stretching out from the sides, hanging down from the top—in fact, in every possible direction: here, then, was a solution of all the evil. It now became a question how these pests were to be eradicated, and after canvassing in my mind a variety of suggestions, I determined to endeavour to remove them individually, and by this means they were speedily got rid of; from fifty to a hundred being taken out daily. The method by which this operation was effected was as follows:—A long glass capillary tube open at both ends was introduced into the water, having the finger kept tightly over the upper orifice, while, with the edge of the lower opening, the polype was detached from its hold; the moment this was effected and the Hydra began slowly to fall through the water, the finger was removed, and the water with the polype was thus rapidly driven into the tube by the pressure of the external column of water; on replacing the finger the contained water and polype were removed. By persevering in this course they were caught with the greatest rapidity and dropped into another vessel before they had time to attach themselves to the interior of the tube, falling through the water like a miniature parachute. When situated in places where this mode of capture could not be employed, as on the leaves of the Vallisneria or on the under sides of the rock-work, they were pulled off with a jerk by means of a small pair of forceps. In this manner between four and five hundred polypes were removed from a small aquarium holding about six gallons of water. Since this some small carp and also minnows have been placed in the same water, and have continued now for upwards of sixteen months in perfect health.

It is a curious problem as to the manner in which this destruction of life was brought about: my own impression is that the Hydras seized on the minnows whenever their extended tentacula were

touched by the swimming fish,—stinging them, and causing a great degree of irritation; and that the polypes were torn from their position by the greater strength of the fish and carried to their places of retreat, where, by consequence, the mischief was continually accumulating. A similar removal from one place to another of an analogous creature, the young of the Actinia, takes place in sea water, from their attaching themselves by their tentacula to some moving denizen, the hold being released very soon after they are forced from their original attachment.

Sea Water. Memorandum 1.—In my previous experiments in this branch of the subject, commenced in January, 1852,* and of which some results were communicated to the British Association at their meeting last year at Hull,† I stated that the result of my experiments to ascertain the kind of sea-weed best fitted for maintaining the balance with the animal life was, under ordinary circumstances, in favour of the Chlorosperms, and that the Rhodosperms submitted to the like conditions did not answer the purpose desired and at the same time retain their colour and beauty, inasmuch as they very soon became coated with a growth of short green and brown Confervæ (*Conferva tortuosa?*), which entirely mantled the whole surface of the fronds and destroyed their characteristic appearance. During these investigations, however, it occurred to me that it might be possible to obviate this drawback, and I have, I believe, succeeded, after a series of experiments, in overcoming this inconvenience, and can now retain them in all their natural loveliness, and render them quite efficient for all the purposes required—that is, as consumers of carbonic acid and generators of oxygen.

The ground on which I have reasoned as a basis for these experiments has been the consideration, that nearly the whole of these red or pink-coloured sea-weeds are found either in deep water or under the shade of other Algæ, and from the fact that they were also often known to occur in shallow rock-pools: it was hence fair to assume that the pressure of the column of water could not be an important element in the production of these coloured growths, and therefore that it must depend upon a modification of the light. Hence my idea was that the effects of the depth of the water might be capable of being imitated by tinting the light through the interposition of

* 'Garden Companion,' January, 1852.

† 'Zoologist' for 1853, p. 4118.

coloured media, and thus all the results observed in the vegetation, and much even of the healthy animal life of deep sea water could be, under this arrangement, assimilated; and this, I am happy to state, has proved experimentally to be the case, so that, by very simple means and with very little trouble, we shall be enabled to grow and preserve these elegant and beautiful plants in all their varied hues, as well as many of the wondrous forms of animal life usually found associated with them, for any length of time; and thus a much enlarged field for observation will be brought within the limits of our aquarium.

In order to obtain this desideratum, a medium having a blue or green tint has been had recourse to, and of such a nature as merely to colour, soften or diffuse the light, without materially diminishing its quantity. This was at first accomplished by the employment of a thin film of paint of the desired shade, of a thin silk gauze of a blue colour, by layers of tissue paper tinged blue and green, sometimes oiled to render them more transparent, at others the sheets of paper being superposed until the desired effect was produced, or by coloured varnishes, blue, and blue and yellow, and mixed to the tint required. These materials should be applied to the surface of the glass, or interposed between the source of light and the water, in such a way that the whole of the light which directly illuminates the aquarium may be tinted of the proper colour. In proportion to the quantity of light at command and the varying aspect to the sun's rays, so must the transparency of the colouring medium be adjusted. In my own case I have been obliged partially to employ coloured glass, as the other methods were found to impede too much of the direct light; but it must be borne in mind that this is in the midst of a crowded city, in a smoky atmosphere, and surrounded by tall houses. To such an extent has this plan succeeded, that several small attached pieces of delicate red sea-weed which I had received in October, 1852, and had become thickly mantled with the brown and green confervoid growth already alluded to, and which had not exhibited the least signs of vitality, on being placed in a small glass jar arranged with tinted and oiled tissue-paper, soon lost the whole of this parasitic growth, from its gradually decaying and being then consumed by the mollusks, the fronds assuming their deep crimson hue, becoming perfectly clear, and even after so long a period throwing out numerous young shoots or leaflets; and on one of these pieces several beautiful specimens of the Coryne sessilis made their appearance, together with groups of Lepralia and corallines.

Memorandum 2.—Another very interesting experiment that I have had progressing very successfully for some time past, is the preserving sea water in a perfectly transparent and healthy state without the use of vegetation of any kind, or, in some cases, even of a scavengering mollusk. The adoption of these experiments was in a great degree forced upon me from circumstances which have been already published. In the paper read before the Meeting of the British Association at Hull, I stated that in consequence of the ravenous propensities of the crabs and the varieties of rock-fish, I had been obliged to establish several small imitation rock-pools, so as to separate these various depredators from each other; and as some of these, the blennies, also attacked the common periwinkle and other mollusks which were employed as scavengers, the plant or vegetation consequently became of little use, and was therefore omitted altogether from the arrangement. It may be asked, then, how can the sea water under such circumstances be possibly kept in a healthy state? Why, thus: by exposing a very extended surface of it to the action of the air, and at the same time limiting its depth. The means that I have been adopting for upwards of twelve months consist in the employment of shallow circular stone-ware pans of about eighteen inches internal diameter by five inches deep; these are filled for about two inches with water, the bottom is supplied with sand and shingle, and numerous fragments of rock-work are arranged at the sides, some close below the surface of the water, others rising in gentle slopes above, and others again grouped to form cavities of retreat, so as to accord with the habits of the crabs, blennies, &c., placed in them. The whole is covered with a sheet of common window-glass, raised about one-fourth of an inch from the edges of the pan by means of slips of wood, so as to allow a free current of air over the surface of the water, and at the same time impede the evaporation and prevent the greater part of the dust and soot from settling on it. By this arrangement a very extended surface of water is submitted to the oxidizing influence of the air, and the fish and crabs, by their continual movements, cause sufficient motion in the fluid to expose a fresh surface frequently to its action, and thus keep up its aëration. But it must be borne in mind, that the oxygenation of the water thus effected is a very delicate equilibrium, and the maintenance of a healthy aëration is liable to be disturbed by very slight interfering causes; nor do I conceive that this method would be applicable except to such marine denizens as are either of such low organization as to require but little aëration of the water, or to such as the crab tribe, the blennies,

cotties, gobies, and those creatures which delight in very shallow water, or which have the power of climbing out of their liquid element. The varieties I have myself kept in perfect health for the period mentioned are crabs, blennies, gobies, cotties, and varieties of Actinia. Cancer Mænas has under these circumstances cast its skin three times during the present year, having increased in its dimensions most extraordinarily each time.

Memorandum 3.—The form of aquarium which, after upwards of five years' experience and observation on the natural habits of the various animated tenants, I have now adopted, consists in a four-sided vessel having the back gradually sloping upwards from the bottom at an angle of 45 to 50 degrees, and the consequently extended top sloping slightly downwards and resting on the upper part of the back. The bottom, therefore, becomes necessarily narrow. The front for the purposes of observation, and the top for the admission of light, are to be of glass; the back, ends and bottom being constructed of slate; the whole fixed in a stout framework.

The advantages of this arrangement are:—

First. That it allows of a most extended view of the whole interior of the aquarium.

Secondly. That it enables the occupants to resort to water of any depth they may desire, or even to ascend the sloping back and emerge from the water.

Thirdly. It admits of a much larger surface of water being exposed to the action of the light; and

Fourthly. The sloping top allows the water which condenses on the glass, from the effect of radiation, to trickle off and return to the aquarium without first resting on the zinc or iron frame-work.

I need hardly mention that the sloping back is to be covered with light rock-work extending to a short distance above the water-line.

ROBERT WARINGTON.

List of Land and Fresh Mollusca found in the neighbourhood of Banbury, Oxfordshire. By RICHARD STRETCH, Esq.

THE nomenclature of this list is that of Gray's 'Turton's Manual.'

Neritina fluviatilis. Not uncommon in the Cherwell, but small. I collected about two dozen specimens in a few minutes. Turton (page 33) limits this species to the southern part of the island; but I have

found it at York, along with Planorbis corneus and Cyclas rivicola, which he states are not found further north than Nottinghamshire.

Paludina achatina. Abundant in the Cherwell and the Oxford Canal.

Bithinia tentaculata. Common in most of our streams.

„ ventricosa. The Cherwell.

Valvata piscinalis. Abundant in the Cherwell.

„ cristata. Rare. The moat at Broughton Castle.

Arion ater. Very abundant.

" hortensis. A few specimens in the same localities as Limax agrestis.

Limax maximus. Not uncommon in damp situations.

„ flavus. Rather common in the cellars here. They are difficult to find, as they do not come out of their hiding-places till about midnight. I found one specimen which was infested with a colony of white lice, which ran swiftly about its body without any seeming inconvenience.*

„ agrestis. Very abundant.

Vitrina pellucida. Common in moist herbage at the bottom of hedges.

Helix aspersa. Common everywhere.

„ hortensis. Not uncommon along with H. nemoralis.

„ hybrida. A few specimens in a small wood, with hundreds of H. nemoralis.

„ nemoralis. Very common.

„ Pomatia. I have not found this species nearer than Charlbury Forest, where it is abundant.

„ arbustorum. Common, but local; feeding on the rank herbage in damp ditches.

„ lapicida. Not uncommon amongst loose stones at Charlbury.

„ pulchella. Common in moss and under stones. I have found the variety imbricata in dry situations, as mentioned by C. Ashford in his list of shells found at Ackworth (Zool. 4262).

„ fulva. Not unfrequent in damp woods.

„ aculeata. Amongst decaying vegetable matter at the bottom of hedges.

„ hispida. Common under stones.

„ rufescens. Common in the hedge opposite the Union.

* This circumstance is of frequent, if not constant, occurrence.—Ed.

Helix concinna. Found along with H. rufescens.

„ virgata. Very common, feeding on the scanty herbage of the limestone rocks.

„ caperata. Five or six specimens on a mud wall at Hanwell.

„ ericetorum. Hill-side near Wiggington Heath.

Zonites rotundatus. Common under stones.

„ umbilicatus. Common in the limestone walls at Edge Hill and Chipping Norton.

„ pygmæus. Pretty common in damp grass.

„ cellarius. Common under stones.

„ allianus. Ditto.

„ purus. Frequent in damp ditches and woods.

„ nitidulus. Common under stones.

„ radiatulus. Occasional.

„ crystallinus. Rather common along with Z. purus.

Succinea putris. Found in marshy situations, but not so plentiful as S. Pfeifferi.

„ Pfeifferi. Common in marshy ditches and osier-beds.

Bulimus obscurus. A few specimens at the roots of trees.

Zua lubrica. Common in gardens and woods.

Achatina acicula. A few dead specimens from a dry bank at Broughton.

Pupa umbilicata. Common beneath moss and at the roots of grass.

„ marginata. A few specimens from Rainsbro' Camp.

Vertigo pygmæa. Beneath the moss on the old wall of Rainsbro' Camp.

„ pusilla. Same locality as V. pygmæa.

Balea perversa. Not uncommon on old walls at Sibford and Astrup.

Clausilia bidens. Not rare in the woods at Edge Hill.

„ nigricans. Very abundant in woods.

Carychium minimum. Common at the roots of mossy grass.

Limnæus auricularis. Some fine specimens from the canal and river.

„ pereger. Very common, as also is the var. lineatus.

„ stagnalis. Common in the river Cherwell.

„ palustris. Very abundant in the Oxford Canal.

„ truncatulus. Not uncommon along with L. palustris.

Ancylus fluviatilis. Common in running streams, but small and difficult to find, being generally covered with a greenish incrustation.

Velletia lacustris. Not uncommon under the leaves of plants in the Cherwell.

Physa fontinalis. In the Cherwell.

Planorbis corneus. Not uncommon in the river.

„ lævis. Moat at Broughton Castle.

„ marginatus. Very common.

„ vortex. Common in small ponds and ditches.

„ spirorbis. Ditto.

„ nitidus. Rare.

„ contortus. A few specimens of this species have occurred.

Cyclas rivicola. Very common in the Cherwell.

„ cornea. Common in the river.

„ calyculata. In a large pond at Hanwell.

Pisidium nitidum. Ditto.

„ Henslovianum. Two or three specimens from the moat at Broughton.

„ amnicum. Common in the river and along with P. nitidum.

„ cinereum. A large pond at Hanwell.

Anodon cygneus. Very abundant; the varieties are so numerous that I cannot say with certainty which are found in this neighbourhood.

Unio pictorum. Not uncommon in the Cherwell.

Dreissina polymorpha. The sides of the canal for some distance are lined with multitudes of this species of all sizes: the large specimens are much corroded at the umbones.

In conclusion, I will just mention a method of representing the animals of Mollusca generally, which is peculiarly applicable to the genera Arion, Limax, and others which have either a very small shell or none at all. I have seen it carried out to some extent in the cabinet of a friend of mine in this town, and the effect is extremely good. He models the animal in a paste made of new white bread, worked between the fingers to such a consistency that it is easily moulded without cracking, and when it is nearly dry he paints it the natural colour, and varnishes it over. The semitransparency of the body is beautifully imitated by this method if the paste is kept clean.

Richard Stretch.

Parsons Street, Banbury,
November 18, 1854.

On the Introduction of Forms of Animal and Vegetable Life into New Localities. By Alfred Merle Norman, Esq.

Times are changed. No longer is the student of the works of the Creation looked upon as half-witted, or despised as one who trifles away his time in an idle and useless pursuit. Each day is adding to the number of our naturalists. The time when the study of Nature was centred in the few is gone, we trust, never to return; and some acquaintance with the leading features of Natural History is considered at the present day to be almost a necessary part of education.

Many have been the causes which have conduced to this most encouraging state of things. Zoological and Botanical Gardens, Museums, Ward's cases, and glass tanks, have brought many of the most beautiful productions of the animal and vegetable kingdoms before the eyes of hundreds, who would otherwise have been ignorant of the existence of such gems. They have looked, admired and looked again; the attention at length becomes fixed, and what was at first a mere idle gaze ripens into one of interest, and ends in enthusiasm. I have known many such instances, more especially resulting from admiration of the rich and endless variety of form and colouring displayed by the prisoners in Marine Vivaria.

Another cause of the impulse which the study of Natural History has of late received, has been the establishment of Natural History Societies throughout the country; and although the meetings of many such societies consist for the most part of persons who come to see their friends, and not from any real regard to the objects of the meeting, yet still they cannot listen to the lectures, usually delivered on such occasions, without receiving some instruction; and their being present at any rate tends to make Natural History *fashionable.* Many of these societies, moreover, have already done much real scientific good in adding not a little, by means of carefully prepared local Faunas and Floras, to our knowledge of the geographical distribution of animals and plants.

The microscope has been a third and most invaluable incentive to many to look more closely into the works of Nature; and while it has revealed to the astonished student the fact that each drop of water is in itself a world, the telescope has shown the world itself to be a mere drop of water as compared with the vastness of Creation.

But much of encouragement as we may see in the enlistment which is so rapidly taking place, from these combined causes, in the

ranks of science, and rejoice as we may over each recruit that is added to our staff of working naturalists, whether in field or barracks, we must nevertheless all look most carefully and cautiously, lest, instead of forming our troops into a firm phalanx, we fall foul of each other, and thus endanger the safety of our "Natural Defences."

The dangers referred to are many in number; but there is one to which I would wish in particular to call attention, as being of rapid growth in the present day, and to which the more scientific mode of studying Natural History now adopted has in a great measure contributed.

An acquaintance with the mere form of any natural object was formerly deemed sufficient, and Natural History was pursued for the sake of simply naming a collection of objects which would look pretty in a cabinet. Under these circumstances the mere descriptions of outward forms were all that were required; and but few entered upon scientific investigations of those classes of animals which they studied. Natural History has now soared above this degrading state of things, and every fact is esteemed as important which will in any way tend to elucidate any portion of the history of particular species; the minutest details of habit and food, growth and development, habits and economy, as well as of anatomy, external and internal, are considered of value, and to be worthy objects of the most searching investigations.

In order that they may forward these views, many lovers of Nature, when they have met with some rarity in another district, are not content with procuring specimens at the time, from a wish to possess so great a prize in their immediate neighbourhood, or for the still more natural and justifiable cause, that they may examine and watch the development of their protégés, but are in the habit of transporting animals and plants from one district to another. But although the watching of the success that attends such trials may be highly interesting to the individual making the experiments, and the changes which result from difference of climate, soil, or food, in specimens of the animal or vegetable kingdoms, may be highly instructive to all, still such experiments as are now referred to should not be made without certain precautions having been adopted, lest, while in minor points the experiment be instructive and of value, in major ones it prove detrimental to the last degree. If every naturalist were to introduce exotic forms of life into this country, or carry animals and plants from one part of Great Britain to another, science would suffer one of the severest blows that could be dealt at it. Our previously

conceived ideas of geographical distribution would be subverted, and, in the inextricable confusion that would ensue, naturalists of the present time would hereafter receive but sorry justice, and would be thought to have overlooked many objects which our descendants had through their greater assiduity discovered; while naturalists of future years would find themselves entangled in a very Penelope's web in the vain attempt to unravel the knot we had tied, and to separate truly indigenous species from those that had been introduced.

I would earnestly beg, therefore, that any one who shall hereafter introduce any form of animal or vegetable life into a new locality, or may have already done so, will make known the same through the medium of the 'Zoologist,' or any other such like publication, to his brother naturalists of the present and future times; and I trust that my namesake, Mr. G. Norman, will have the kindness to send the names of the Mollusca he has succeeded in naturalising in the North of England (Zool. 4435) for insertion, and thus set an example, which I hope all, under the same circumstances, will follow.

There is little doubt but that many forms of exotic animal life would as easily become acclimatised in this country as do those of the vegetable kingdom; but whether it is desirable thus to introduce them is a matter on which there is a great diversity of opinion. All I wish now to enforce is the great importance of *making known, in the most public manner possible, every instance of foreign importation into this country, or into any particular neighbourhood.* It would take up too much of your space were I to enumerate the many uncertainties that have arisen, with regard to the ascertaining of true natives, from the neglect of this most important measure in past times. Many such will occur to your readers in almost any branch of Natural History in which they may be interested.

ALFRED MERLE NORMAN.

Isle of Cumbrae, N. B.
Sept. 10, 1854.

Ravages of Caterpillars. By the REV. ARTHUR HUSSEY, M.A.

FOR the last two summers many of the gardens in this village have been infested by caterpillars to such an extent, that the cabbages have been *utterly* destroyed. When fully fed, the vermin, as usual, crawled away in search of a spot where to undergo their next change,

at which period the ridges of the surrounding walls presented a curious appearance, being occupied by a continuous string of the creatures, generally travelling in the same direction. Last year a favourite goal was the roof of a large house, near which an immense host had been bred, and the walls, being white, rendered very conspicuous the unbroken dark line of the insects, which for some time persevered in swarming up it, and which not merely entered the rooms, but crept into the beds, among clothes, or into any other place of concealment, the only remedy for the nuisance being to keep the windows closed. Though the owner of the premises employed a number of boys, his scholars, in sweeping with brooms the walls leading to the house, their exertions produced no visible effect; consequently they were soon relinquished. A band of melted tar was next drawn under the coping of the wall on the side whence the hostile hosts proceeded, but to no good purpose, for when the vermin reached the tar, they simply followed it to the extremity of the wall, where it ceased, and then resumed their former course. The rate, too, at which these little animals advance, is far more rapid than would be imagined, though some attention will prove that their motions are really quick, their sole object during the journey appearing to be to "move on."

A large proportion of the caterpillars of 1853 took refuge in a malt-house, from which they could not escape as butterflies, the result being that for several weeks during the past spring and summer the maltster swept up *daily many hundreds* (700 or 800! I was informed) of the dead insects. Notwithstanding, though rather less numerous than in 1853, they abounded quite sufficiently this year to cause the annoyance and loss alluded to above, especially as they arrived in successive swarms: if the garden had been completely cleared of them, a fresh army was speedily to be perceived as busily engaged as its predecessor.

The 'Zoologist' for 1846 records (Zool. 1442, 1443) the immigration about Dover from the Continent of an immense flight of white butterflies, in the beginning of July in the same year, and the pest, from whatever cause it might proceed, certainly extended to this place, the cabbages that season, partially if not generally, having been entirely devoured. I then noticed for the first time the operation of the ichneumon flies, the effect being that few or none of the caterpillars were observed by me in the chrysalis state, and that in 1847 the gardens were, if I recollect rightly, free from the ravages of the preceding year. My experience on that occasion induced me to

watch the course of events last autumn, but, though the ichneumons were neither entirely absent nor yet inactive, the proportion of their victims to those which escaped seemed very small indeed. During this season, however, the number of "fly blown" caterpillars must, I conceive, have been ten times that of 1853, even although the aggregate amount of both sound and unsound may have been less; from which circumstance I am disposed to anticipate the great mitigation, if not the total cessation, of the plague in 1855.

Among countless nests of ichneumons already changed to the chrysalis state, I searched long before I could discover an example of the little maggots in the act of emerging from the body of the caterpillar, but eventually succeeded very fully. By that time the caterpillar is in a torpid condition (but not dead, since it moves if touched), remaining quite still while the parasites gradually extricate themselves with a wriggling motion, sometimes in such a quantity that it is impossible to count, without removing, them. I have seen a mass which I should estimate at two dozen at least. Their next change must occur very rapidly, for in one instance I examined a brood, of which only one was distinctly visible, and that was busily engaged in spinning the silky web wherein it was to be enveloped. On my return, in about twenty minutes, I looked again, when the little creature had completely concealed itself. A very large proportion of the ichneumon-cases have now for some time been empty, but what may be the general rule with regard to the perfect insect coming forth must be left to entomologists. The flies I have seen were very small.

In the first volume of the 'Zoologist' (Zool. 326), I have related some illustrations I had noticed of the prevalence and sudden disappearance of certain insects, which disappearance, in one case, I was able to trace to its probable cause. The phenomena now described are of the same class, being among the innumerable proofs we possess of the care wherewith a wise and beneficent Providence maintains "the balance of power" in its creation; and showing that, although vermin of various degrees and kinds are occasionally sent in vast multitudes for our chastisement or our trial, provision is also mercifully made for the alleviation and final removal of the infliction.

In the course of the observations detailed above I remarked a few particulars, which may be appended to this account. Among the victims of the ichneumon flies I have not known one *green* caterpillar, though they are sometimes offensively plentiful upon the cabbage tribe. They may suffer, but I have never seen any which had

done so: perhaps they protect themselves by their habit of penetrating very deeply into the plant, besides that their colour renders them less conspicuous than others. Neither am I aware that the number of the green caterpillar ever approaches *nearly* to that of the variegated kind, as during the last two seasons. The latter insect, when uninjured, seems to me to undergo its change, if upon a plain surface, in a perpendicular position, with the head uppermost. Frequently, however, it selects a depression in the face of a wall, or fixes itself under the coping bricks, or in some similar spot, when its position is necessarily varied according to the situation, but I have *never*, I believe, found a chrysalis *reversed*. When the insect has become merely a case for the parasites, it makes the final pause in any direction, as often as not perhaps with the head downwards. Among the myriads which wander in search of a resting-place, not one perhaps of the sound, and very rarely one of the unsound, caterpillars will stop upon a wall exposed to the south or south-west, that is, to the winds from the sea. A favourite locality is a line of wall facing eastward, and open throughout to the north-east; consequently they can have no instinctive apprehension of the effects of frost, contrary to the common and groundless notion of that being generally fatal to insect life.

Experience has suggested to a neighbour and friend, who has been much pestered with the creatures, that probably a very durable green dye might be obtained from the bodies of cabbage-fed caterpillars. Years of washing have not effaced the stain of one accidentally crushed upon linen, nor will water remove such marks from a brick pavement.

ARTHUR HUSSEY.

Rottingdean, November 10, 1854.

Proceedings of Natural-History Collectors in Foreign Countries.

MR. H. W. BATES.*—Santarem, March 27, 1854.—Although I cannot get ready a collection by this month's steamer, I think it well to write, and chiefly to let you know of the safe arrival, a fortnight ago, of the box of books and packet of letters forwarded by you on the 26th of December last. I cannot give you an idea of the pleasure it caused

* Communicated by Mr. S. Stevens.

me to receive so many cheering, valuable, and useful books and letters, especially as a long time had passed since hearing from you, and I had began to feel disconsolate. The seven vols. of 'Suites á Buffon' I very much needed, especially the Hymenoptera part, and henceforward you may depend upon it the bees, ants, &c., will feel the effect, and I hope many curious notes of habits can be prepared for the 'Transactions.' You did quite right to send me the two vols. of Jardin des Plantes Catalogues. These catalogues are very necessary, as the best books we can get only describe a small portion of the subjects, which deficiency the catalogues supply, and thus a complete guide to collecting is made up between them. The last time I wrote (January last) I informed you of the safe arrival of not only the box of books you sent in May, 1853, but also the long-lost parcel of May, 1852, so that up to the present time not a single article or letter you have advised me as forwarded per Singlehurst & Co. is missing. I have not had such good fortune with the 'Illustrated News' by mail; I have not received more than half the numbers sent; therefore do not send me any more by that conveyance. As to books I am quite set up in all the orders of insects, and do not require anything now except first-rate Monographs, as they appear, such as what I ordered of you, Lacordaire's 'Phytophages,' and also such as F. Smith's Monograph of Cryptocerus, and Catalogues of British Museum and Jardin des Plantes, as they appear. They at present seem to be working on different families and orders: of course, when the London and Paris Catalogues are on the same group, it is not necessary to send both. Chemnitz you can continue to send as it appears. In my January letter I ordered a few British Museum Catalogues, amongst them Part 1, Hemiptera; but, however, all the Zoological Catalogues (except those on British Fauna only) from this day forward would be useful to me, and you can send me them by degrees. Please thank Messrs. Hanbury, Janson and Baly for their notes and letters: to Mr. F. Smith I will write, if there be time, before post closes. To Mr. Hanbury please say I never lose an opportunity of acquiring objects in his department. The difficulty is not in collecting together plenty of different kinds of balsams, resins, or medical roots and barks (really so or only reported), the real difficulty is in identifying these separate objects with the tree which produces them, and acquiring a flowering specimen of it. This is much aggravated by the loose terminology of the Indians, who give the same name to very different things. The same applies to useful woods, but still by degrees I am getting a correct knowledge of these things. To Mr. Baly please say that I will

bear him particularly in mind in collecting the ants and bees: of the Œcodema, since I have received his note, I have found two species quite different from the true cephalotes, and I think it likely I may add immensely to the number of species of ants. The Eulaima I now know very well, and shall procure males and females of every species. One species, I believe, makes its nest in wood: the Mesopliæ and Mesocheiræ of St. F. are very likely parasites on them. In the cyclicous Coleoptera I will also bear him in mind: it was a favourite group with me last year, as I drew up a careful analytical description of all the generic forms—a mass of manuscript, with brief characters of about 400 species: although they are the only Coleoptera here one may call abundant in individuals, many of them (especially the Megalopi and Megaceles) require a long time to get a tolerable set of. Mr. Wallace, I suppose, will be off ere this, therefore next month will do to reply to his kind letter. I hope somebody will send me a copy of his other book, the Voyage. The Palms I have now two copies of, and it is really a very correct, useful book on the class. I can add many species, however, to his list, and I doubt not Mr. Spruce could double it. It is curious that two months before receiving your last letter I had been attending to the Termites. I began first to look for M. Schiödte's new Staphylini and ended by becoming greatly interested in the Termites, without, however, finding the Staphylini. Some of the results of my examination up to the present date I intend to send you on separate sheets. The specimens will follow next month. I have examined about 100 colonies: some of the results I have come to are, that there are no truly apterous imagos; that there are only two kinds of larvæ, fighters and workers; that a large hillock is always an agglomeration of many very distinct species which build with very different materials; that some species cherish only one female and one male adult in a colony, whilst others have a great number, 50 or 100 adults, the male and female in about equal numbers. Lastly, I have detected a very good character to distinguish male and female in the pupa and adult states. I have found pupæ in various stages of growth or ecdysis, without, however, as yet, detecting the first moult from the larva to the pupa, to decide what becomes of the monstrous apophyses of the head and the mandibles of the soldier (fighter) larva. My remaining collections I will send next month, just before I leave for the Upper Amazons, which I expect will be early in May. The Cattleya, &c., I will look for when I get to a good place for them. I understand the business, I think, quite sufficiently. You make me very envious in only speaking of the Morpho Cypris, &c., of

Bogotà. I wonder how they are captured, if they are like M. Adonis and Hecuba here: about five miles from Santarem these two Morphos and a third very red and orange in colour appeared for a few days at the beginning of the wet season, but they would never descend lower than from 30 to 40 feet. I watched them for hours, until I nearly dislocated my neck with looking up at them. The one Adonis I sent from Parà, for my private collection was caught by a lad I employed, by climbing a tree.

Santarem, April 27, 1854.—By the steamer this month I send a cedar-wood chest containing six boxes of insects, a few specimens of economic Botany, and miscellanies. The insects to be placed with my stock of private collection are those things which I find it most difficult to preserve in this climate; and by degrees I see I shall have to send the whole of my private collections of other families, which become mouldy here more readily than the others. The collection for sale contains a large lot of ants, with many notes for Mr. F. Smith, a letter, and a collection of Termites, which I have had great trouble to keep from Acari and mould, many having been destroyed: my notes on these I consider important, containing several discoveries I have made on their habits. The notes might be published in the 'Trans. Ent. Soc.'; if you would get the species drawn, described, and named, they would form a splendid paper; in fact, I flatter myself, would attract much the attention of naturalists. The phial with Termites in spirits is in a tin box in the parcel: there is also a specimen of a species of Orchis (lilac-coloured, but not a Cattleya I think); just show it and ask if good; I am growing one part of it on a tree in my garden. I wrote you last month acknowledging the receipt of your most welcome parcel of letters and box of books, which, up to this date, has been to me a continued intellectual feast, and given me lots of occupation. In the account of the insects I send you now, I have kept the ants and Termites as separate items; I want to see how they sell; the British Museum, I think, should have the Termites, if they arrive in good condition; with the notes I send they become of value. Please to thank Mr. Hanbury on my part for the present of the pamphlets and the hints contained in his two notes. I scarcely expect to find any of the different kinds of balsams of Peru in the Valley of the Amazons, except it is near the eastern foot of the Cordilleras. The present collection I have taken great care to keep free from mould. The ants and other Hymenoptera are pinned and

dried so carefully that I am sure they will be valued as specimens, if the moisture does not collect on them. I find the Diptera and Orthoptera most difficult to keep, and am afraid I shall be obliged to send them all to be kept in London, and therefore lose the pleasure and advantage of having them at hand to study. What I now send of the private collection I have made memoranda of, so as to know pretty well when I meet with a fresh species in future. I cannot yet send you a collection of showy Diurnes, as you request; there are none at Santarem except the very common, as C. Dido, the common Agraules, Callidryas, &c. I have never seen an Epicalia Ancea here, nor any of the handsome Parà Papilios, except now and then a Sesostris. At Ega I could get you up a glorious collection of 1000 to 2000, and I am hourly expecting the Nanta steamer down, when I shall bargain with the captain to take me up here on his return (I suppose it will be considered a favour, besides costing £15 or £20 passage money).

H. W. Bates.

Entomological Botany (with more especial reference to the Plants frequented by the Tineina). By H. T. Stainton, Esq.

(Continued from page 4472).

Stellaria Holostea. Greater Stitchwort.

Common in hedges, frequently growing in considerable masses, and when in flower "its brilliant white starry blossoms render it very conspicuous." The association of ideas with this plant is pleasant; we think of it in connection with the lengthening evenings at the end of April, when everything is bursting into leaf, and the cuckoo's song is first heard. I remember, when a child, I was told the plant was "Cuckoo's Bread and Cheese," but I have not observed this given as a synonym in any botanical work. As early as January we may find the larva of Gelechia tricolorella mining the leaves of this plant, and at a later period (March and April) screwing up the terminal shoots and feeding therein. (See 'Transactions of the Entomological Society,' vol. ii. New Series, plate x. fig. 1). In April the leaves are mined by the larva of Gelechia maculea, which at the end of May may be found in the capsules feeding on the seeds. (See 'Transactions of the

Entomological Society, vol. ii. New Series, plate x. fig. 2). At the end of April and in May the larvæ of Coleophora solitariella may be noticed in their pale whitish cases attached to the under side of the leaves, in which they make pearly white blotches, by devouring the parenchyma. (See 'Transactions of the Entomological Society,' vol. ii. New Series, plate xi. fig. 3). The young larvæ of this last species may be met with feeding in October and November.

Stellaria uliginosa. Bog Stitchwort.

A common but rather insignificant plant, frequenting moist places, and growing almost concealed among the ranker herbage; in the early spring (March and April), when the smooth shining leaves are just making their appearance, the small shoots are noticed to be distorted into various uncouth shapes: this apparent malformation is caused by the presence of a brown larva which feeds in the heart of the young shoots; it is the larva of Gelechia fraternella. (See 'Transactions of the Entomological Society,' vol. ii. New Series, pl. x. f. 3.)

Cerastium glomeratum (vulgatum). Broad-leaved Mouse-ear Chickweed.

The larva of Gelechia fraternella, though most partial to the preceding plant, may occasionally be found in the shoots of this, and the larva of Coleophora solitariella has also been observed feeding on this.

Malva moschata. Musk Mallow.
Malva sylvestris. Common Mallow.
Malva rotundifolia. Dwarf Mallow.

No Tineina larva is known to feed on any of these plants, though the two last are almost universally distributed: when we bear in mind how the larva of Gelechia malvella feeds in the seeds of the allied Althæa rosea, the Hollyhock of our gardens, it is difficult to imagine that the seeds of our wild mallows, or "cheeses," as they are called by children, are not to the taste of any of the numerous larvæ of Gelechiæ which are still unknown to us.

Althæa officinalis. Marsh Mallow.

Speyer gives this as a food-plant of Eubolia cervinata; however, the larva of that species is more accessible on the Hollyhocks, which

grow nearer home than "marshes, particularly near the sea," which Babington gives as the habitat of this plant. I am not aware that the Althæa officinalis has ever been examined by any Micro-Lepidopterist.

Tilia europæa. Lime Tree.

The list of Micro-Lepidoptera feeding on this tree or its congeners (*parvifolia* and *grandifolia* which, for entomological purposes, do not claim a distinct notice) is rather formidable. Speyer gives the following:—Smerinthus Tiliæ, Aglia Tau, Endromis versicolora, Stauropus Fagi, Petasia cassinea, Notodonta camelina, Platypteryx sicula, Cossus ligniperda, Zeuzera Æsculi (the two last feeding *in the wood*), Hypogymna dispar, Leucoma Vau-nigrum, Dasychira pudibunda, Pygæra bucephala (which sometimes actually defoliates the trees prematurely), Gastropacha Pruni, Pæcilocampa Populi, Eriogaster lanestris, Acronycta Psi, Amphipyra pyramidea, Miselia Aprilina, Orthosia instabilis, O. stabilis, Xanthia Citrago, Cosmia trapezina, Hibernia defoliaria, Nyssia hispidaria, Biston hirtarius, Odoptera Alniaria, O. erosaria, O. angularia, Ourapteryx Sambucaria, Eurymene dolabraria, Harpalyce Corylata, Euthalia psittacata, and two of the Micro-Lepidoptera, Tortrix Ribeana and Rosana.

The Tineina larvæ feeding on the lime are few in number; Mme. Lienig found on it the larva of Cerostoma sequella in May; she also states that the larva of Röslerstammia Erxlebella feeds on the lime in May and September, on the under side of the leaves, in which it makes large round holes; but, as I have elsewhere stated, I suspect there must be some mistake here; the larva of Coleophora anatipennella (the Tiliella of Schrank) sometimes feeds on this tree in May; and in winter and spring the larva of Chrysoclista Linneella feeds on the inner bark: this species, which is so excessively abundant around London, is a rarity in many localities, and is nowhere common on the Continent. The larva of Bucculatrix Hippocastanella feeds on the leaves of the lime in June and August; probably when young it mines the leaves, but on this point we are yet uninformed. It is singular that no larva of Lithocolletis or Nepticula has hitherto been observed on this tree.

Hypericum perforatum. Common Perforated St. John's Wort.

The larva of Cloantha perspicillaris (of which only one British specimen is known) feeds in July and August on this plant; the larvæ of the allied species C. radiosa and Hyperici (which have never been

detected here) also feed on it in June and July. Speyer also gives the larva of Anaitis plagiata as feeding on it. The larva of Catoptria Hypericana feeds in the shoots in May, and in the seeds in July; and at the end of May and beginning of June the larva of Depressaria Hypericella may generally be met with in the screwed-up heads of the plant, unless the contortion has been caused by that polyphagous nuisance to the collector Sciaphila subjectana: the larva of Gracilaria auroguttella mines the leaves when very young, making a slight pucker longitudinally, and afterwards constructs a neat cone of the leaf (see 'Transactions of the Entomological Society,' vol. ii. n. s. pl. xiv. f. 3), which, at first green, speedily turns dirty yellow, from the epidermis and half of the parenchyma being taken away from the inside of the cone; the cones are then very conspicuous, and may readily be noticed in July and September: when the larva is full fed it quits the cone, and twists up a short leaf longitudinally, making a miniature imitation of a cigar, within which it changes to a pupa: these cigars are at first quite green, but turn to a dirty greenish brown colour; they may be noticed at the end of July and during winter. The larva of Cemiostoma lustratella is stated to feed on this plant; but though no doubt it occurs here, it has not hitherto been detected as British. In September and the following months, the leaves are mined and slightly puckered by the larva of Nepticula Septembrella, which is, however, more partial to Hypericum pulchrum.

Hypericum hirsutum. Hairy St. John's Wort.

The larvæ of Catoptria Hypericana and Depressaria Hypericella also feed readily on this plant.

Hypericum pulchrum. Small Upright St. John's Wort.

The principal food-plant of Nepticula Septembrella, the larva of which I have observed feeding in the glossy little leaves as late as December; the delicate little patterns which it traces in these leaves are quite in harmony with the general neat appearance of the plant.

Acer campestre. Maple.

The food-plant of two of our rare prominents, Lophopteryx cucullina and Ptilophora plumigera, both of which have lately been met with on the chalk in Buckinghamshire, though on the same strata South of London they have not been observed. Speyer also enumerates Pygæra bucephala, Xanthia sulfurago, Cosmia trapezina, Anisopteryx Aceraria (a species exceedingly likely to occur in the South of England) and

Ephyra omicronaria. The larva of Dictyopteryx Förskaliana is excessively abundant on this plant at the end of June, and the pupa may be conveniently collected in the leaves which have a corner turned down very closely. The active larva of Gelechia scriptella may be found in September doubling the leaves nearly in half, and tying the sides together by some strong silken cables. In July and in October the leaves are apt to have a slight distortion at the edges, caused by the larvæ of Lithocolletis sylvella, which establishes its puckered mine on the under side of the leaf. No larva, either of a Coleophora or a Nepticula, has yet been observed on the maple. The seeds, or "keys" as they are sometimes called, merit attention, as probably they will be found to afford nourishment to more than one species of insect: I once found a Lepidopterous larva in one.

Acer Pseudo-platanus. Sycamore.

The larva of Acronycta Aceris, one of the most beautiful we have, frequents this tree, though also partial to the horse-chestnut; Speyer also enumerates the larvæ of Odoptera lunaria, O. illunaria, O. illustraria, Ptycholoma Lecheana, and Gracilaria rufipennella; the larva of the last-named species forms cones on the leaves (similar to those of G. stigmatella on sallows and willows) in the month of June.

Æsculus hippocastanum. Horse-Chestnut.

Though not an indigenous tree, I am obliged to mention it here, it being too important entomologically to be overlooked; the wood is eaten by the larva of Zeuzera Æsculi, and the leaves by the larva of Acronycta Aceris and Anisopteryx Æscularia. The larva of Bucculatrix Hippocastanella should be found on the leaves in June and at the end of August, and this is the only Tineina larva at present known to frequent this stately tree.

H. T. Stainton.

Mountsfield, Lewisham,
January, 1855.

(To be continued).

Professor Bailey's mode of giving Permanent Flexibility to Natural-History Specimens.—The mode of application which I have employed is to immerse the dry specimen for some time in a neutral saturated solution of chloride of calcium, which any one can make for himself, by saturating hydrochloric acid with marble, and then, after the specimen has become sufficiently softened to bend easily, remove it, and let it drain in the open air. In some cases, where the specimens do not imbibe the salt

readily, it is well to soften them in warm water before immersion in the salt. A speedy impregnation will then take place, after which the specimens, if plants, may be subjected to moderate pressure in the usual way, and restored to the herbarium, while other specimens may be kept on shelves, or in any way usually employed for similar objects, and all will, for any length of time, retain sufficient moisture to prevent brittleness. The salt being neutral, no fear need be apprehended of its injuring colour or texture, while its antiseptic properties will aid in the preservation of matters liable to decay.—*From 'Silliman's Journal.'*

Rare Birds killed near Scarborough.—The following rare birds have lately been killed in our neighbourhood:—one red-necked phalarope, fourteen gray phalaropes, five stormy petrels, four little auks, four purple-backed sandpipers, one red-throated diver (mature), one female goosander. On the 25th of November, a noble female specimen of the gyr-falcon was shot near Robin Hood's Bay, on the moors of Sir John Johnstone, M.P.: the bird is in the finest adult plumage: beak pale blue; cere wax-yellow; irides black; head, neck, breast and lower part of body white: upper parts are white, sparingly marked with arrow streaks of black pointing downwards: the tail has no bars, but is white; legs yellow; talons brown: the crop was overloaded with the entrails of some animal, most probably a hare; the stomach with the feathers of grouse and portions of the grouse. The length of this majestic bird, from the point of the beak to the end of the tail, was 20¾ inches; full extent of wings when opened, 3 feet 10 inches; weight, 3 lbs. 3 oz. Sir John Johnstone has forwarded the bird to me to be preserved.—*Alfred Roberts; King Street, Scarborough, December* 1, 1854.

Occurrence of the Short-toed Lark (Alauda brachydactyla) *and of the Lapland Bunting* (Emberiza Lapponica) *in Sussex.*—Mr. Swaysland, of Brighton, the fortunate captor, as recorded in the 'Zoologist' for this month, of the Sylvia galactotes (? galactodes), possesses a short-toed lark and a Lapland bunting, both which were caught in lark nets in the neighbourhood of Brighton, and were kept alive for a time.—*Arthur Hussey; Rottingdean, November*, 1854.

Note on the congregation of Swallows.—About the 14th of last August I noticed a number of swallows to roost every evening in a small willow plantation, in this parish. This number gradually increased, until about the middle of September, when they amounted to thousands—I was going to say myriads. To see their movements about roosting-time was one of the most pleasing sights which I have ever witnessed amongst the feathered tribes. About six o'clock every evening, several hundreds of birds, apparently those bred in the parish, collected together at a particular part of the air, and amused themselves by twittering and hawking after flies. In a short time another body of swallows would arrive, evidently from another locality, and their arrival was announced by a burst of twittering from both parties: then arrived another from an opposite direction; the same actions were repeated, and it joined the main body. In this manner the original flock was augmented, apparently from all points of the compass, and it gradually swelled into a tremendous flight, which kept up such a loud, continued twitter, as to arrest the attention of the most inattentive. As I sat and watched the birds assembling, with unwearied delight, I have often been struck with astonishment at their amazing multitudes; for their numbers seemed really sufficient to people every town and hamlet in England. To watch them retire to roost was a singular spectacle: they collected over the willow-bed, circled round and round

at a great height above it for some time, then down came a hundred or two into the middle of the willows, like a shower of large black soot-flakes, the main flock continuing to circle round and round until it came immediately over the bed, when down came another shower of them, and so on, until the whole had descended. The noise which they made was precisely like that of a steam-engine when blowing off the steam; it could readily be heard at the distance of a quarter of a mile. Upon creeping cautiously up the plantation I found every twig, every leaf, bush and bit of herbage alive with birds, for they were shuffling about in order to settle down comfortably; ten or twelve would occupy one small branch scarcely two feet long. The stench arising from their droppings was very disagreeable, and the ground, strewn as it was with them, reminded one of some guano deposit upon the shores of the Pacific. To see them day by day set out in different directions, each to his appointed work—to watch them gradually congregating night by night at the same hour, and move off to roost almost to a minute—to witness the harmony which seemed to reign amongst them, their unanimity of purpose, and the completeness with which they acted, as it were, upon one organised plan, was extremely interesting, and reminded one more of an army of peaceful human beings gathered together upon some high occasion than a congregation of simple and diminutive birds. They came every evening to roost in the manner described until the 17th of September, when they departed, leaving only a few hundreds, which remained until the middle of October. I have seen the usual autumnal congregations, but never saw one upon the same immense scale before. How came they to congregate in a locality which they never had visited before in such numbers, and five or six weeks before they usually assemble in the autumn? In the 'Illustrated London News,' of November 8, I read the following remarks of the Paris correspondent, who, writing of the cholera, which had been raging fearfully in that city, said, "A singular fact has been observed, viz., that the swallows, which had entirely deserted Paris during the time that the epidemic raged, are beginning to return. To prove how much the existence of this malady influences the feathered tribes, we may state that, in the month of June, 1849, when the cholera was at its height in Paris, a flight of swallows passing over Paris, which they had previously deserted, a large number fell dead, and were picked up in the streets or floated down the river." During the period when the swallows assembled here in the multitudes which I have described, the cholera was raging fearfully in London and other large cities and towns. Is it probable that they had deserted localities where this disease was rife? Were they noticed to leave the suburbs of London during the prevalence of it? Large congregations, I know, occasionally are found in the autumn roosting upon willows upon the banks of the Thames and some other rivers. Are they ever found in immense congregations so early as the 14th of August? With us they do not flock much together until the latter end of September or beginning of October, departing, on an average, about October 20th.—*John Joseph Briggs; King's Newton, Swarkeston, Derbyshire, November* 14, 1854.

A White Swallow obtained in East Kent.—I have received information that, towards the end of October, a white swallow was killed in the neighbourhood of Sandwich, having been observed and pursued by several persons. "The head, neck and upper part of the back were a delicate silvery light brown, shading off in the under parts, tail and wings, to a not very pure white;" and the bird is stated to have "looked brilliant in the sunshine." The gentleman who shot it has sent it to Mr. Leadbitter, in London, for preservation.—*Arthur Hussey; Rottingdean, November* 10, 1854.

Occurrence of the Pigmy Curlew (Tringa subarquata) *and Little Stint* (T. minuta) *near Warrington.*—Mr. Fletcher, Curator to the Warrington Museum, shot several specimens of Tringa subarquata and T. minuta on the sands above Runcorn on the 6th ult., and more have been killed since by other parties. They are rarely met with in the river Mersey.—*Nicholas Cooke; Massey House, Penketh, November* 6, 1854.

Occurrence of the Ruff (Tringa pugnax) *at Prestwick Carr, Northumberland.*—Perhaps it may interest some of the readers of the 'Zoologist' to know that the ruff is occasionally procured so far north as Newcastle. Prestwick Carr, a tract of boggy moor, some 1100 acres in extent, and about seven miles north-west, is annually visited by immature specimens, or birds without the ruff; but this season several have been seen in full breeding-plumage; one or two of these were shot, and are now preserved in the neighbourhood.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, December* 6, 1854.

Occurrence of the Egyptian Goose (Anser Ægyptiacus) *near Newcastle.*—A fine specimen of the Egyptian goose was shot at Blaydon Flats, about three miles above Newcastle, on the 16th of November last: it is in beautiful plumage, and has the appearance of having been a wild bird.—*Id.*

Occurrence of the Lesser White-winged Gull (Larus islandicus) *near Scarborough.*—A specimen of this rare and valuable gull was obtained, under curious circumstances, on the morning of the 8th of December. I was taking the temperature of the sea from the outer pier, when I observed floating a gull which had been shot by some sportsman; at first I took it to be a young specimen of Larus canus, but, observing no black on the tip of the wings, I felt satisfied it was a rarity, and when taken out of the sea it proved to be an immature example of the lesser white-winged or glaucous gull: it is not unfrequently met with at the Shetland Islands in the winter season, but, taken on our coast, is a treasure for the ornithologist. My specimen measures in length 21 inches; the wings, when closed, reaches 2 inches longer than the tail; eyes dark brown; colour, dull white, very beautifully clouded with pale ash-brown.—*Alfred Roberts; King Street, Scarborough, December* 11, 1854.

Occurrence of Richardson's Skua (Lestris Richardsoni) *in Sussex.*—In the last week of September, during or just after a high wind, a skua gull, pronounced to be Richardson's, was picked up in a dying condition by a shepherd upon the Downs above this village.—*Arthur Hussey; Rottingdean, November* 10, 1854.

Occurrence of the Little Auk (Alca alle) *in Northumberland.*—During November, two or three specimens of the little auk have been procured in Northumberland. One of these was picked up alive, in an exhausted condition, near the village of Cramlington, which is several miles from the sea.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, December* 6, 1854.

Occurrence of Tetrodon Pennantii on the Coast of Ireland.—I have much pleasure in recording the capture of another specimen of Tetrodon Pennantii, about fourteen days since, at Ardmore, County Waterford; being washed ashore, like the individual recorded by me in 1852, than which it is somewhat smaller.—*E. H. Sargint; 26, Dengille Street, Dublin, December,* 1854.

List of Spiders found at Piercefield, near Chepstow, in 1853.—

Lycosa campestris
„ lugubris
„ saccata
„ obscura
Dolomedes mirabilis
Salticus cupreus
„ scenicus
„ coronatus
Thomisus cristatus
„ bifasciatus
„ brevipes
„ pallidus
„ incertus
„ floricolens
„ citreus
Philodromus dispar
„ cespiticolis
Clubiona erratica
„ comta
„ amarantha
„ accentuata
Ciniflo ferox
„ atrox
Tegenaria atrica
Cælotes saxatilis
Theridion nervosum
„ pulchellum
„ lineatum
Linyphia triangularis
Linyphia montana
„ pratensis
„ nebea
„ pulla
„ insignis
„ fuliginea
„ marginata
„ cauta
„ tenuis
Neriëne rubella
„ munda
„ dubia
Pachygnatha Degeerii
Epëira diadema
„ inclinata
„ antriada
„ cucurbitina
„ conica
„ callophylla
„ scalaris
„ apoclisa
„ ceropegia
„ fusca
„ albimacula
Tetragnatha extensa
Dysdera Erythrina
„ Hombergii
Segestria senoculata.

—*F. Walker; The Grove, Highgate, October,* 1854.

Inquiry respecting the name of an Australian Spider.—It will be esteemed a favour if any reader of the 'Zoologist' will mention the proper appellation of the Australian spider of which the habitation is a hole in the ground, with a moveable entrance. Of the example now before me, from the neighbourhood of Adelaide, the door is triangular, the apex being undermost, with the sides rather curved, and it is suspended by somewhat acting as hinges attached to the base of the triangle. When I first saw the specimen, soon after its arrival from the antipodes, the door opened easily, though now unfortunately it is fixed. It is impossible to ascertain of what the hinges are made and how constructed, or to describe the interior of the cell, without destroying the curiosity. The substance of the door resembles the surrounding soil, and appears to have been *cut out* of the solid surface, rather than compacted of compressed mud. If there are varieties of this insect, the generic name of the tribe can be given, though it will be impossible to identify the individual. The information requested may be either inserted in a future number of the 'Zoologist,' or forwarded by post to the *Rev. A. Hussey, Rottingdean, Brighton,* who will be thankful for attention to this inquiry.

'*Entomologists' Annual.*'—It is with much pleasure that I have read Mr. Stainton's proposal on this subject in the 'Zoologist' for October; such a publication seems to be a great desideratum; and I would venture to suggest that it is no less a desideratum that a similarly compiled record should be formed of the occurrences of *rare* species which are noted from time to time in the 'Zoologist' and other periodicals: beginners are so constantly tantalised by learning that species marked rare by our great authorities have, since their works appeared, been more generally found, though the fact be only known to those who have regularly perused the public journals. Such a record, even if it were merely to mention the names of the species, localities and captors, with a reference to the page at which they are detailed more fully, would be a great boon to the younger followers, at least, of the science, and I think it might easily be conjoined with Mr. Stainton's already determined work. To make the book extensively useful, *every* order of insects ought to be noticed in it, as the author would wish; and I sincerely hope that all entomologists will combine to assist so desirable an undertaking.—*A. R. Hogan; Charlton, Dundrum, near Dublin, October* 10, 1854.

Singular Variety of Anthocharis Cardamines.—I have a specimen of this insect, taken by a friend of mine at Hainhault Forest, which has the orange spot of the male on the under side of the right wing only; the upper side representing the perfect female.—*William Machin;* 35, *William Street, Globe Fields, Mile End.*

Note on Ptilophora plumigera.—Having met with a few eggs of this Bombyx on maple sprays, last winter, and bred the perfect insect from them this November, I have pleasure in communicating a few facts about its transformations. The egg occurs about here on the young shoots of the maple in hedge-rows. It is light brown, circular, and has a white ring round it, which is, in fact, the under side. It is found singly, or in twos and threes, and is pretty visible in the sunshine. The larva appears about the middle of April, or as soon as the maple bursts; at first it is hardly perceptible to the eye, being transparent and of a pale yellow colour; it soon beeomes grass-green, with a dorsal stripe of darker green, bounded by two white lines: while young it is distinctly hairy. It sleeps during the day, frequently under the leaf it fed on the preceding night, and is of quiet habits and apparently social, as two often fold upon one leaf. Soon it changes its skin, and then assumes yellow rings about the shoulders, but retains the general grass-green tint and large transparent green head until ready to change: the white lines now become fainter, its habits are more active, and it feeds night and day; lastly, the tint becomes blueish, like Camelina before its change, and the dorsal stripe disappears. About the end of May or early in June, the larva buries nearly two inches below the surface, and there spins an oval cocoon, from the top of which is suspended the pupa: this is cylindrical, compressed and bifurcate at the tail. By placing the breeding-cage (in my case, a flower-pot) in the sunshine, about the middle of November, I found the perfect insect emerged from the lower end of the cocoons—in one instance escaping through the bottom of the flower-pot. Of the two varieties, the light and the dark, the latter seems rarer.—*Bernard Smith; Marlow, December*, 1854.

Occurrence of Notodonta carmelita.—It was my good fortune to take a fine specimen of this rare insect last year, and another this year, both early in May, at West Wickham. —*William Machin;* 35, *William Street, Globe Fields, Mile End.*

Early appearance of Cucullia umbratica.—I took this insect in beautiful condition, on the 6th April last, at Wilmington.—*Id.*

Curious Capture of Pœcilocampa Populi.—A few days ago I was agreeably surprised at finding in an old garden-shed, where I usually keep my breeding-cages, fourteen

males of Pæcilocampa Populi sitting on the window and other parts of the shed, some of them rather worn, but others in beautiful condition. Not being otherwise able to account for so unusual an occurrence of an insect I have never before met with and have always regarded as rather rare, I set it down to their having been driven in for shelter in a sudden and violent storm of wind and rain that had taken place late the night before, which was previously very calm and bright: however, the next day, visiting the shed again, the night having been throughout remarkably quiet, I found in it, to my great surprise, eleven more, some sitting on what I had before considered an empty breeding-cage, but which, on close examination, I found to contain a female of the same species, apparently lately out, and in fine condition: this of course explained at once the appearance of the males. Now, though it is a well-known mode of capture of various species—of the Bombyx, &c., in particular—to expose a female in a gauze-covered cage, yet the instance I mention is remarkable, both from the number of males attracted by a single female in an out-of-the-way situation, under a north wall and at a distance from trees, and their remaining after daylight, and reposing in such a position as to be discovered and taken with the greatest ease: these facts may be useful as hints in experiments with this mode of capture in respect of the rarer Notodontidæ. The female, being a desirable acquisition, was of course made a specimen of immediately, and I need hardly say that not a single male has appeared since her removal. I was not aware of having placed in the cage any larva of P. Populi; but, on recurring to my notes of a Day in the New Forest last June, I find one of the beating for an oak on the 22nd of that month "a large gray flattish, hairy larva, irregularly marked with black," which, as it has never answered to its number in any other form, I conclude was the producer of this moth, but from which I had ceased to look for any perfect insect, concluding it to have been previously affected by some parasitical devourer. — *Octavius Pickard-Cambridge; Bloxworth House, Dorset, December* 14, 1854.

Remarkable Vitality in a Specimen of Sitona fusca.—I was much surprised this morning, on taking up a phial containing insects collected at Petersham on the 28th of September, to find a specimen of Sitona fusca alive, having been seven weeks all but one day in the bottle. The laurel-leaves which had been enclosed with it still retained a considerable aroma, though not of course that hydrocyanic smell which is so quickly fatal to all insects. The Sitona was not only alive, but vigorous, travelling along at little less than the customary pace, and much more actively than many Curculios do when in full health. In the same bottle, which contains barely a cubic inch, and was well corked, were three more of the same species, together with Apion striatum and others, Halticæ, Atomariæ, Demetrias atricapillus, Notoxus monoceros and some small Brachelytra, all, however, quite dead. I have remarked, in introducing insects into a phial with laurel-leaves, that the Brachelytra are usually the first to yield, then the Malacoderma and Geodephaga, and that the Curculeonidæ resist the influence longest; Diptera and Hymenoptera seem very soon overcome. It is somewhat remarkable that one Sitona should appear little affected under circumstances that killed three others.—*George Guyon; Richmond, November* 15, 1854.

Proceedings of Societies.

Entomological Society.

Donations.

November 6, 1854.— Edward Newman, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'Entomologische Zeitung,' July to October; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1854, No. 9; par M. F. E. Guérin Ménéville; by the Editor. 'Journal of the Society of Arts' for October; by the Society. The 'Athenæum' for October; by the Editor. The 'Literary Gazette' for October; by the Editor. The 'Zoologist' for November; by the Editor. 'Smithsonian Contributions to Knowledge,' vol. vi.; 'Seventh Annual Report of the Board of Regents of the Smithsonian Institution for 1852;' 'Directions for Collecting, Preserving, and Transporting Specimens of Natural History,' 2nd Edition; 'Registry of Periodical Phenomena,' one sheet; 'Catalogue of the Described Coleoptera of the United States,' by Friedrick Ernst Melsheimer, M.D., revised by S. S. Haldeman and J. L. Le Conte, 1 Vol. 1853 (6 copies); 'List of Foreign Institutions in Correspondence with the Smithsonian Institution;' 'Natural History of the Red River of Louisiana;' (reprinted from the Report of Captain R. B. Marcy); all by the Smithsonian Institution, Washington, U.S. 'Boston Journal of Natural History,' vol. vi. No. 3; 'Proceedings of the Boston Society of Natural History,' pp. 225 to 384, November, 1852, to April, 1854; both by the Boston Soc. Nat. Hist. 'Proceedings of the Royal Society,' vol. vi. No. 102; 'Philosophical Transactions of the Royal Society,' Vol. cxliii. Part 3, Vol. cxliv, Part 1; 'List of the Royal Society, 30th November, 1853;' all by the Royal Society. Plutella annulatella (2) and Tinea ochraceella (2); by George Wailes, Esq. A box of Scotch Lepidoptera and Coleoptera; by Mr. Foxcroft.

Election of a Member.

Professor Edward Solly, F.R.S., F.L.S., &c., was ballotted for and elected a Member of the Society.

Exhibitions.

Mr. Stevens exhibited a new British beetle, Otiorhynchus septentrionis, *Herbst*, a single specimen taken by Mr. Foxcroft at Rannoch. He also exhibited some insects sent from Port Natal by Mr. Plant, including the rare Goliathus Derbyanus and Tefflus Delargorguei; also two living examples of an Iulus which were imported in a case of plants, and had been in his possession more than a fortnight.

Mr. Salt sent for exhibition a fly presented to him by a medical friend, who wrote concerning it "It was apparently blown out through the nostril by a gentleman who had long had pain in the face, and discharge of pus from the nose and throat. It is supposed to have been lodged in the 'antrum of Highmore,' a cavern that exists naturally in the bones of the face." It appeared to be Phora urbana. Mr. Westwood said he had reared species of this genus of fly from wool and animal rejectamenta, such as old crab-shells. Mr. Walker had reared them from Fungi, and Mr. Curtis from the body of one of the Sphingidæ.

Mr. Stainton exhibited a specimen of the rare Elachista triseriatella, taken by Mr. Hogan near Dublin, and specimens of a new Simaëthis, for which he proposed the name S. Parietariæ, the larvæ having been found by Mr. Harding on Parietaria officinalis.

Luminosity of Helobia brevicollis.

Mr. Westwood said Mr. Gould had placed in his hands a specimen of the common beetle Helobia brevicollis, which he found one evening lately near Windsor, having been attracted thereto by its luminous appearance. Mr. Westwood thought the luminosity was due to adherent particles of phosphorescent matter arising from some decaying animal, or a Geophilus—one of the luminous Scolopendræ—on which the Helobia had been feeding; both these views, indeed, had been advanced with respect to a luminous Goërius, at a Meeting of this Society on December 1st, 1851, by the late Mr. Stephens, Mr. Curtis, and Mr. Smith.

Motion communicated to Seeds by Insects.

Mr. Janson, adverting to the Report of the discussion on this subject at the last meeting, said that in his remarks on that occasion he did not mean to deny that *any* motion could be communicated to the seeds by the imprisoned larvæ, but he still maintained that the possibility of larvæ, perfectly enclosed in seeds, having the power of causing the seeds to *jump* had not been explained. The instance quoted from Kirby and Spence he did not think was analogous, for that was evidently a naked chrysalis unencumbered by an extraneous envelope.

Mr. Westwood read the statement in Kirby and Spence's 'Introduction,'* which had been referred to, where, alluding to Réaumur's Memoir upon the enemies of caterpillars, they say, "Round the nests of the Processionary Bombyx he found numerous little cocoons suspended by a thread, three or four inches long, to a twig or leaf, of a shortened oval form and close texture, but so as the meshes might be distinguished. These cocoons were rather transparent, of a coffee-brown colour, and surrounded in the middle by a whitish band. When put into boxes or glasses, or laid in the hand, they surprised him by leaping. Sometimes their leaps were not more than ten lines, at others they were extended to three or four inches, both in height and length. When the animal leaps, it suddenly changes its ordinary posture (in which the back is convex and touches the upper part of the cocoon, and the head and arms rest upon the lower) and strikes the upper part with the head and tail, before its belly, which thus becomes the concave part, touches the bottom. This occasions the cocoon to rise in the air to a height proportioned to the force of the blow." In the same chapter of the 'Introduction' it is also recorded by the author, "that in 1810 a young lady informed him a friend had brought a similar chrysalis, which was found attached by one end to the leaf of a bramble. It repeatedly jumped out of an open pill-box that was an inch in height. When put into a drawer, in which some other insects were impaled, it skipped from side to side over their backs, for nearly a quarter of an hour, with surprising agility. Its mode of springing seemed to be by balancing itself upon one extremity of its case. About the end of October one end of the case grew black, and from that time the motion ceased; and about the middle of April in

* Vol. ii. page 299, 4th Edition.

the following year a very minute ichneumon made its appearance by a hole it had made at the opposite end." Réaumur could not ascertain the fly that should legitimately come from the cocoon, for different cocoons gave different flies: whence it was evident that these ichneumons were infested by their own parasite. This might have been the case with the cocoon mentioned by the lady.

Mr. Westwood said, that though in this account the *chrysalis* was stated to be attached to the leaf, yet it was evidently an enclosed pupa, for its *case* is immediately afterwards mentioned. Since the last meeting he was satisfied the larvæ in the seeds were Lepidopterous, and thinking it possible that only those seeds moved that contained a larva infested by an ichneumon, he had inquired of Sir William Hooker if there were any exceptions, among the affected seeds, in the power of jumping, but was informed all gave equally strong leaps.

Mr. Curtis said that at the last meeting he had observed "he expected the seeds contained the larva of a Bruchus," and in confirmation of Réaumur, and of the possibility of an insect confined in a hard case having the power to give it motion, he had stated that "he had a compact horny oval cocoon formed by an ichneumon, which bounded about on a table like an India-rubber ball, shortly before the fly hatched." In order to identify the fact with the insect, he had searched for and found the specimen which had been disregarded for twenty years, and he now had the satisfaction of exhibiting the insect with its cocoon, and the label attached to it when the fly hatched. It was a Campoplex allied to C. majalis, *Grav.*, and probably described by that author; but the species of this genus being very difficult to identify, he would not venture to characterise or name it. These Ichneumonidæ are parasititic on the Tortricidæ and smaller moths, and also on the Curculionidæ.

Mr. Lubbock said it would not be difficult to demonstrate, according to the laws of matter and motion, that the muscular power of an insect in the situation referred to, if exerted in a particular manner, would cause a jumping motion in its envelope.

A new British Cynips and the Galls made thereby.

Mr. Rich, present as a visitor, exhibited some sprays of oak thickly covered with bunches of large galls. In Somersetshire generally, and in part of Gloucestershire, they were so abundant that the oaks were covered with them, to the extinction of the acorns, the loss of which, for feeding their pigs, the farmers greatly regretted, although he believed that in the value of these galls they had more than an equivalent, for their chemical qualities were nearly equal to those of the imported galls of commerce.

Mr. Curtis said, Mr. Rich recently gave him an example of this gall, and he had since received some of the galls with a specimen of the fly from his friend W. H. L. Walcott, Esq., who obtained these galls from an oak growing near the Hotwells, Clifton. Having paid great attention to the Cynipidæ,* and bred most of those which are produced from oak trees, he had often been doubtful regarding the true Cynips Quercus-petioli of Linnæus, but he was convinced the specimen he now

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* Vide vols. i. ii. iii. iv. and v. of the 'Gardener's Chronicle,' for the economy and figures of Cynips aptera, C. umbraculus, C. Quercus-tiaræ, C. lenticularis, C. Quercus-pedunculi, C. Quercus-ramuli, C. Quercus-castaneæ, and C. Quercus-folii.

exhibited, which was bred with a few others from the galls alluded to, is the Linnean species. He believed all that have hatched are females, but as there are many maggots alive in some of the galls he expected the males would appear in the spring.

Cynips Quercus-petioli is described by Linnæus in his 'Fauna Suecica,' No. 1523, where he refers to Rœsel, who has given good figures of the galls, fly, &c.* The flies are much larger than any other species which has been described as British, and they are nearly allied to those produced from the galls of commerce, the Diplolepis gallæ-tinctoriæ of Olivier. He was inclined to think the species was of recent introduction into England, for during the time of his researches into the Cynipidæ neither he nor the many friends who assisted him with specimens from all parts of the country had ever seen it, and such conspicuous galls could hardly have escaped notice if they had existed.

Mr. Stainton said that for the last four or five years he had noticed these galls in Devonshire, but not in such profusion as now stated.

The President said he had some doubts if this was the Cynips Quercus-petioli of Linnæus, for the galls were situated in the axil of the leaf, and not on the petiole.

Chrysomelidæ of Australia.

Mr. Baly read the concluding portion of his Memoir on the Chrysomelidæ of Australia.

New Part of the Transactions.

Part 2, vol. iii. N. S. of the Transactions, published in October, was laid on the table.

December 4, 1854.—Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Catalogue of the Birds in the Museum of the East India Company,' Vol. i.; by the Hon. Court of Directors of the East India Company. The 'Literary Gazette' for November; by the Editor. The 'Athenæum' for November; by the Editor. The 'Zoologist' for December; by the Editor. The 'Journal of the Society of Arts' for November; by the Society. 'Revue et Magasin de Zoologie,' No. 10, 1854; by the Editor. 'Insecta Britannica,' Diptera, Vol. ii., by F. Walker; 'Lepidoptera—Tineina,' by H. T. Stainton; by the Committee of the 'Insecta Britannica.' 'List of Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part i. Lepidoptera—Heterocera; 'List of Specimens of Dipterous Insects in the Collections of the British Museum,' Part v. Supplement 1; 'List of Specimens of Neuropterous Insects in the Collection of the British Museum,' Part iv., Odonata; 'List of the Specimens of British Animals in the Collection of the British Museum,' Part xiv., Nomenclature of Neuroptera; all presented by Mr. F. Walker. The First Annual Supplement to 'Insecta Britannica, Lepidoptera—Tineina,' by H. T. Stainton; by the author.

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* 'Insecten Belustigung,' iii. Supp., tab. 35 and 36.

Election of a Member.

George Wailes, Esq., Newcastle-on-Tyne, was balloted for and elected a Member.

Exhibitions.

Mr. Pickersgill exhibited a fine specimen of Argynnis Lathonia, and a variety of Vanessa Urticæ in which the colours of the upper wings were not distinct but suffused, and the under wings were almost entirely black. Both these butterflies he caught near Eastbourne, Sussex, on the 29th of July last.

Mr. Saunders exhibited two examples of a small patelliform nidus, probably of a spider, attached to a leaf of Chailetia latifolia received from Rio Negro.

Mr. Stevens exhibited some Coleopterous larvæ, which had destroyed a large cherry-tree drooping by forming galleries in the solid wood, a log of which he also showed. The larvæ were probably those of Gnorimus nobilis.

Mr. Tweedy exhibited a box of Coleoptera and Lepidoptera, among which were some new species, just received in fine condition from St. Domingo.

Photographic Representations of Insects.

Herr Pretsch, Manager of the Imperial Printing Office at Vienna, present as a visitor, exhibited a great number of magnified positive photographs of various insects and parts of insects.

Mr. Westwood observed, that though these figures gave very good general representations of the objects, yet the details were not sufficiently accurate for entomological purposes; indeed, he had never seen the small parts of insects delineated by this process with the clearness necessary to render the figures of scientific value.

Mr. Curtis thought that, if greater distinctness in detail could be attained, the photographic process would be invaluable for representations of the wings of the Ichneumonidæ and the neuration of wings generally.

Singular Specimen of Anthocharis Cardamines.

The President exhibited a specimen of Anthocharis Cardamines, which had been placed in his hands by Mr. W. Machin, of Mile End: the insect combined the characters of the sexes in a remarkable manner: the whole of the upper surface of the upper wings, as well as the antennæ, head, thorax and abdomen, present the normal appearance of a female: there was nothing whatever to induce a doubt of the individual being a female: the same observation applied to the left wings on the under side, but the right upper wing on the under side was adorned with the bright orange mark distinctive of the male. Many insects were known to be subject to what he (the President) had called *hemigynism*, *i. e.* when the individual is divided by a right line down the back, the one half being male and the other half female; the peculiarities of each sex extending not only to the distribution of colour, but also to the structure of the antennæ, eyes and genitalia; but the present instance differed from any that he had previously seen, in the fact of the entire upper surface being female.

Introduction of Bombyx Cynthia into Malta and Italy.

Mr. Westwood exhibited a sample of the silk produced at Malta from cocoons of Bombyx Cynthia, which sample was given by the Governor, Sir William Reid, to Dr. Templeton, and by him forwarded to Mr. Westwood with the following letter:—

"Valetta, November 10.

"My dear Westwood,

"I take advantage of the Governor's kind offer to send you the enclosed silk, *unwound* from the Cynthia cocoons by Signor Lotteri, an Italian, skilled in silk-winding, who declared that his fingers stuck together for a very long time afterwards, so gummy and resiny was the binding matrix of the silk. The result seems very fine, and is, I believe, very strong, in comparison with the silks of similar thickness. At Casal Zebbourg a gentleman introduced, from the Governor's gardens, some of the worms, got little boys to tear the cocoons to pieces, and native women to spin it; and there is now hanging, in the window of Mr. Goodenough's shop, a pair of stockings and some lace-work made from the spun silk: the stockings have a muddy look, the colour of the enclosed, but in other respects appear fine substantial affairs, such as country people would be glad to get; and I believe they are everlasting. The great business is to get a machine to tear the cocoons to pieces, and that will soon follow, I presume. They have got the worm now into Tripoli in a fine healthy state; and planting castor-oil plant is now the order of the day everywhere.

"I trust the packet of live cocoons arrived safe, which were sent to you by the Governor's directions, per last mail. His Excellency was much pleased by the note in the 'Athenæum' respecting them.

"Very truly yours,

(Signed) "R. Templeton."

Mr. Westwood added that he had received the cocoons referred to, and found that some at least of the pupæ inclosed were alive, notwithstanding the long journey and the change of temperature to which they had been subjected.

The Secretary read, from the 'Journal of the Society of Arts,' November 10, the following extract from a despatch forwarded by Governor Sir William Reid to his Grace the Duke of Newcastle:—

"We have here in Malta gone through all the operations as practised in Assam, except weaving the silk thread into cloth. For this we have not yet a sufficient quantity; but the worms are breeding here faster than we can rear the castor-oil plant: they are now (in October) thriving in the open air, and as they consume the leaves of the castor-oil, they travel from plant to plant, feeding upon several, but apparently doing well only on the Ricinus.

"The French Government have applied, through their Consul, for a larger quantity of eggs, both for France and Algeria, and I have been enabled to supply him with as many as he requires.

"In consequence of statements published in the 'Journal of the Society of Arts,' I have had an application from the Agricultural and Horticultural Society of Grenada, in the West Indies, for eggs of this silkworm. Some fresh cocoons will be sent from hence to Grenada, and I am not without hope, from the way in which they are being

conveyed, and with the assistance of the Directors of the Royal Mail Steam Company, that eggs in a sound state will reach the West Indies."

The Secretary also read the following extract from the 'Turin Gazette,' inclosed in the above-mentioned despatch:—

"*Culture of Silk in Piedmont.*—Sig. Vincenzo Griseri, the first person who has undertaken the rearing of the Bombyx Cynthia worm upon leaves of the castor-oil plant, and the first who introduced it into France, has now terminated his second experiment of rearing the said worms. Sig. Griseri, conceiving the great service that these valuable insects might render in the production of silk, diligently distributed them to the various provinces of the State, as also in Brianza, and has received from all quarters accounts of a successful result. He succeeded last spring in rearing these worms even upon the castor-oil plants while in the ground and in the open air, in the garden of the Chemical Laboratory, under the observation of Chevalier Cantu, Director of that establishment, the Minister, Conte de Cavour, his Excellency the Duke of Guiche, Minister Plenipotentiary of France, Professors Abbenne and Borsarelli, and many other distinguished personages. From this mode of treatment Signor Griseri discovered that these worms do not suffer from a low temperature, nor from strong winds, nor from continued rain; but, on the contrary, he obtained finer and better-formed cocoons than those produced by the ordinary method, all which circumstances have been submitted to the Royal Academy. After the first experiment he published, through the printers Chirio and Mina, the mode of bringing up these worms. In the second experiment he also fully succeeded, and found that the cocoons were superior to those brought from Calcutta and Malta, on which account he came to the conclusion that this new silkworm, a native of Bengal, has found its own climate in our country. An experiment is now being made as to the mode of extracting the silk, which has been confided to the care of able throwsters, and from some samples already produced it results that this silk is finer and more elastic than our common silk; further, two more important facts have just been communicated by Sig. Griseri, namely, that he has succeeded in feeding these worms exclusively upon willow-leaves and lettuce-leaves, and has obtained cocoons similar to those produced from the leaves of the castor-oil plant. During these experiments Sig. Griseri was assisted by the Countess Marianna Antonini, an experienced producer of silk, and Sig. Francesco Comba, a distinguished naturalist, who kindly offered him their aid and advice. Sig. Griseri intends next spring to try the rearing of our native grubs, the Pavonia major and the Pavonia minor, which feed upon various wild plants, and yet produce silk, as he has already confirmed this by experiment. There is reason to believe from these experiments made by so celebrated a silk-grower, well known by the numerous services he has rendered in rearing and improving the race of silkworms, that the culture of silk will receive a development, the limit of which can hardly be foreseen, as the object is nothing less than to convert the vegetable matter of the most common leaves into the valuable substance of silk."

Larvæ preserved in Canada Balsam.

Mr. Westwood said he had received examples of insect larvæ preserved in Canada balsam, by a gentlemen in Zurich, and he wished to state that they could be furnished at a very reasonable rate.

Galls produced by Cynips Quercus-petioli.

Mr. Stainton, adverting to the mention of this subject at the last meeting, read the following extract of a letter received from R. C. R. Jordan, Esq., of Queen's College, Birmingham:—

"The galls are old friends of mine, I have known them for twenty years: of late they have been more common. I have here some fine specimens of the Cynips, or rather, in searching them out, I have four specimens: I have known the Cynips for three years. About five years ago a medical man at Lympstone, near Exmouth, used them always to make his ink, and tried to impress upon the country people the use that might spring from making them an article, so to speak, of exportation. But of course, as with all other things of this sort, they would gather the galls for him to make the ink, when paid for it, but never made any attempt to sell them elsewhere. They would be a good substitute for the nut-galls, and deserve to be used instead.

"The Cynips appears in September, perforating the gall by a single round hole. The galls themselves are first green, afterwards brown: the larvæ may be occasionally found in them in spring. I have never found any other than a Cynips larva in the galls: in the common cherry-like gall on the under side of the oak leaves, there is a larva of a saw-fly occasionally, and I have a notice of an ichneumon-parasite on the Cynips."

Mr. Stainton added that, since the last meeting, he had ascertained these galls were more than usually abundant this year in Devonshire.

Mr. Curtis hoped that Mr. Stainton would procure some of these galls, for he still doubted if those seen by Mr. Stainton and Mr. Jordan were identical with those he had referred to Cynips Quercus-petioli.

Mr. Westwood said he had announced the discovery of this species in England, in the 'Gardener's Chronicle,' some time since.

Larva of Ctenicerus murinus.

Mr. Curtis read a letter from the Rev. C. A. Kuper Trellich, Monmouthshire, stating that he had found, under a loose stone, a larva of a reddish colour, which he believed to be that of Ctenicerus murinus. The locality was the top of a wall in an elevated bleak situation, whereon stems of gorse had been laid and had decayed, in which stems, he presumes, the larvæ feed, for he had often found the perfect insects thereon while immature.

Locality of Papilio Antenor, Drury.

Mr. Westwood stated that this butterfly was long known only by the figure of Drury, until Mr. Hope received a specimen, taken, as he stated, by Ritchie, at Soudan, in Central Africa, which, however, was doubted by Mr. Edward Doubleday, who considered the species to be an Asiatic form. He had now to announce that the British Museum had just received a specimen from Madagascar. Was it possible the species could have so wide a geographical range, or had there been some error in the former instance?

Mr. Westwood also took this opportunity to state, as bearing upon this subject, that a beetle, Pachylomerus femoratus, stood in Mr. Hope's collection as African;

another species or sub-species of the genus had now been received from Mozambique, on the Eastern Coast of Africa, and yet it had a great resemblance to the forms from Tropical Western Africa.

Economy of various Insects.

Mr. Curtis read a paper entitled 'Notes on the Economy of Various Insects.'

Essay on the British Formicidæ.

Mr. Smith read 'An Essay on the Genera and Species of the British Formicidæ,' in which twenty-eight species were described, being an addition of eleven species to the list of species known in 1851.—*J. W. D.*

SOCIETY OF BRITISH ENTOMOLOGISTS.

November 7, 1854.—Mr. HARDING, President, in the chair.

Messrs. Jobson, Thorne and Oxley were balloted for and admitted subscribers to the Society.

The President exhibited a box containing, in great variety, the Peronea cristana, and remarked on the extraordinary abundance in which that insect had occurred during the present year, and contrasted this with its apparent scarcity during several preceding years: he also exhibited some specimens of Eudorea murana, which he bred from lichens found on old walls; the insects were accompanied by the pupa cases: also specimens of Depressaria liturella with its food, a species of wild mint; and a new insect allied to Cochylis stramineana.

December 5, 1854.—Mr. HARDING, President, in the chair.

The President exhibited the following Lepidoptera:—

Peronea Schalleriana, together with its pupa-case and food-plant, the common meadow-sweet (*Spiræa Ulmaria*).

Cnephasia subjunctana, together with its pupa-case and food-plant, the small spreading rest-harrow (*Ononis reclinata*): the larva spins together the leaves of this plant, thus making a domicile in which to undergo its transformations.

Cnephasia Perterana, with pupa-case and food-plant: the larva draws together the petals of the mouse-ear hawkweed (*Hieracium Pilosella*), and feeds on the stamens.

Cnephasia Virgaureana, with pupa-case: the food of this species varies greatly; the President had bred specimens from the common crowfoot, blackthorn and other plants; many others of the genus are not particular on what plant they feed.

Sericoris lacunana, with pupa-case and food-plant, the common millefoil (*Achillea millefolium*); the larva draws together the leaves which protect the young buds, and feeds on the interior or heart of the bud.

Coleophora Viminetella, with pupa-case and food-plant, the common sallow (*Salix capræa*): a good description of this insect would be found in the 'Insecta Britannica' (Tineina, vol. iii. p. 223).

Coleophora Onosmella, with pupa-case and food-plant, the viper's bugloss (*Echium vulgare*).

On Artificial Sea Water. By Robert Warington, Esq.

In the 'Zoologist' for August last (Zool. 4400) appeared a short communication from Mr. Gosse, on the artificial formation of sea water, and having lately had my attention especially directed to this paper by a friend who wished to put the formula given into practice, I was surprised at the difference in the proportions of the ingredients as compared with what I had myself employed in the course of 1853, more particularly from the circumstance, that when Mr. Gosse called upon me in January last, and consulted me on the feasibility of the plan, I told him that there could be no difficulty in the matter, as I had made and had then in use several small quantities artificially produced, and that all that was required was that a good analysis should be taken as the basis for deducing the proportions, and at the same time referred him to the source from which I myself had worked, namely, Dr. E. Schweitzer's analysis of the water of the English Channel, taken off Brighton.

Now, as numerous parties have been inquiring respecting this subject, and the erroneous formula has been copied into other journals, it may prevent much annoyance as well as disappointment if this matter is set right. The error appears to be twofold, the one arising from miscalculation, the other from assuming that the sulphate of magnesia, as given in the analysis, represented the ordinary crystallized salt, and not the anhydrous sulphate, which is always the case in giving analytical results, and which is, indeed, so specified by Dr. Schweitzer in his paper, when he states that the dry residue obtained by the evaporation of 1000 grains of water amounts to 35·25628 grains, consisting of the following ingredients:—

Chloride of sodium	27·05948 grains.
„ of magnesium	3·66658 „
„ of potassium	0·76552 „
Bromide of magnesium	0·02929 „
Sulphate of magnesia	2·29578 „
Carbonate of lime	0·03301 „
Sulphate of lime	1·40662 „

Now, as these results all stand in the same denomination, grains, it is competent for us to treat them as pounds, ounces, or any other weight that may best suit our purpose, and as the decimal notation is so readily capable of facilitating these deductions, there is no difficulty

in at once arriving at the correct relations. Thus, the gallon of water being equal to 10 pounds, if we wish to estimate the proportions of materials for that quantity, or for 100 pounds, 10 gallons, it only requires that the decimal point should be removed, in the first case, two figures, or, in the latter, one figure to the left, and we have the whole operation completed and the result exhibited in decimal fractions of the pound; thus for 100 lbs. or 10 gallons:—

Chloride of sodium	2·706	
„ of magnesium . . .	0·367	
„ of potassium . . .	0·076	
Bromide of magnesium . .	0·003	anhydrous = 0·472 crystals.
Sulphate of magnesia . . .	0·230	
„ of lime	0·140	anhydrous = 0·178 crystallized sulphate.
Carbonate of lime	0·003	

It will be observed, that, in order to simplify the notation, I have decreased the extended places of decimals and employed the nearest amount to such fraction, by this means throwing off three places of figures. Then, by reducing these decimal fractions to the nearest value in terms of avoirdupois pounds and ounces, the proportions will stand thus for the 100 pounds of water produced:—

		Gosse.
Chloride of sodium	43¼ ounces.	35 ounces.
„ of magnesium	6 „	4½ „
„ of potassium	1¼ „	$0\frac{9}{10}$ „
Bromide of magnesium	21 grains.	——
Sulphate of magnesia anhydrous 3¾ oz. = crystals	7½ ounces.	2½ „
Sulphate of lime anhydrous 2¼ oz. = crystallized .	2¾ „	——
Carbonate of lime	21 grains.	——

In order to exhibit the extent of the error I have alluded to, I have placed in the adjoining column the proportions deduced by Mr. Gosse from the same analysis and for the same quantity of water, one of the ingredients having been omitted, besides the two that exist in so small a quantity. Now, as Dr. Schweitzer's analysis is on a given weight of which the saline ingredients constitute a part, it becomes necessary to deduct their weight from the 10 gallons of water employed: this, it will be seen, amounts to 60¾ ounces, or in round numbers to 60 ounces, which is equal to three imperial pints, so that 9 gallons and 5 pints will be the true proportion of water to be used.

The next point that presents itself is as to the best mode of obtaining these saline ingredients for the manufacture of the artificial sea water,

as many of them, not being usually kept for sale, would have to be made for the purpose. There cannot be a question that by far the simplest plan would consist in the evaporation of the sea water itself in large quantities at the source, preserving the resulting salt in closely stopped vessels to prevent the absorption of moisture, and vending it in this form to the consumer; the proportion of this dry saline matter being 56½ oz. to the 10 gallons of water, less the 3 pints. This plan was suggested by Dr. E. Schweitzer himself for the extemporaneous formation of sea water for medicinal baths, and, on inquiry since writing the above, I find that such a preparation is manufactured by Messrs. Brew and Schweitzer, of No. 71, East Street, Brighton, under the title of "Marine Salts for the instantaneous production of sea water." Mr. H. Schweitzer writes me, that he has for many years made this compound in accordance with his cousin's analysis. The proportion ordered to be used is 6 oz. to the gallon of water, and stirred well until dissolved.

ROBERT WARINGTON.

Apothecaries' Hall, November 1, 1854.

Some Remarks on the Marine Fauna of the South of Devon.

By WILLIAM F. TEMPLER, Esq.

(Continued from page 4468.)

ZOOPHYTA—*Anthozoa Hydroida.*

Hydractinia echinata. On Buccinum undatum, Budleigh-Salterton; ova present in March.

Coryne pusilla. Rock pools, Littleham Cove and Ladram Bay. This zoophyte is much infested with parasites, amongst which I have noticed the beautiful Lichanophora or fan-bearer.

Tubularia indivisa. Dredged off Otter Point by C. J. Harris, Esq.

Sertularia polyzonias. Rocks between tide-marks, Dawlish, Shaldon, Teignmouth, attached to the rocks; very common from the Plymouth trawls.

„ rugosa. Parasitical on Flustra foliacea; Slapton Sands.

„ rosacea. Very fine, parasitical on Plumularia cristata, on the Slapton Sands; not uncommon from the Plymouth trawlers on Plumularia falcata and Sertularia polyzonias.

Sertularia pumila. Abundant everywhere, but very fine amongst the rocks on the Shaldon side of Teignmouth.

„ tamarisca. Plymouth trawlers.

„ abietina. Dawlish, abundant on Slapton Sands; Coppinia arcta may be found growing from it in small yellow tufts.

„ argentea. Very fine on the Warren, Exmouth, attached to mussels; it should be well examined with a lens, for the very small and pretty Campanularia syringa which grows from it.

Thuiaria articulata. I have found it on the Slapton Sands and the Warren, Exmouth, but it is very rare on the Devonshire Coast.

Antennularia antenina. Fine in Torbay, and also fine and very plentiful from the Plymouth trawlers.

„ ramosa. May be obtained from the Plymouth trawls; it is much more common than the foregoing species, and forms the largest portion of the refuse of the trawls.

Plumularia falcata. Plymouth trawlers; on the beach, Dawlish, at times in large quantities.

„ cristata. Rocks to westward of Dawlish between tide-marks; growing on the backs of Corwich crabs, and roots of Laminaria to be found on the Slapton Sands.

„ pennatula. Plymouth trawlers; I found a fine specimen thrown up by Otter Mouth, Budleigh-Salterton, after a heavy gale.

„ setacea. Rock pools, Exmouth.

„ myriophyllum. From the Plymouth trawlers.

Laomedea geniculata. Parasitical on Laminaria digitata, cast on shore on the beach, Budleigh-Salterton.

„ gelatinosa. Parasitical on Fucus serratus beneath the Hoe, Plymouth, abundant; also rock pools to the east of Exmouth.

Campanularia volubilis. From the Plymouth trawlers and Plymouth Sound, by dredge.

„ syringa. Exmouth and Dawlish, growing on Antennularia antenina.

„ verticillata. Slapton Sands, very fine; Plymouth trawlers; vesicles in the month of May.

„ dumosa. Plymouth trawlers, abundant, and also at times on the beach, Dawlish.

Anthozoa Asteroida.

Gorgonia verrucosa. Budleigh-Salterton, many and fine specimens may sometimes be procured here, cast on shore after heavy gales.

Anthozoa Helianthoida.

Caryophyllia Smithii. Attached to rock near low-water mark, near Hope's Nose, near Torquay; I mention this on the authority of Mr. Ralfs.

Actinia coriacea. Abundant amongst the rocks at Shaldon, near Teignmouth, Littleham Cove, Budleigh-Salterton.

,, bellis. Beneath the Hoe, Plymouth; also rock pools, Ilfracombe.

Lucernaria auricula. Abundant on Zostera marina, Mill Bay, Salcombe Estuary. It is also to be found in Littleham Cove, but rare.

POLYZOA—*Polyzoa Infundibulata.*

Tubulipora patina. Parasitical on Alcyonidium gelatinosum, Slapton Sands.

Crisia eburnea. Parasitical on other zoophytes, from the Plymouth trawlers; also from the trawlers, Ilfracombe.

Eucratea chelata. Fine specimens, parasitical on Halidrys siliquosa, beneath the Hoe, Plymouth, after a southerly wind.

Anguinaria spatulata. Beach, Budleigh-Salterton; parasitical on Algæ.

Hippothoë divaricata. On old shells, Budleigh-Salterton.

Lepralia tenuis. On valve of Pecten maximus, Dawlish.

„ unsata. Ilfracombe, between tide-marks, Hole and Smallmouth.

„ pediostoma. Hole, Ilfracombe.

„ semilunaris. On beach, Budleigh-Salterton, and beach, Exmouth, on dead shells.

Cellularia reptans. On Flustra foliacea, trawlers, Ilfracombe.

Flustra foliacea. The Warren, Exmouth; more abundant on the Slapton Sands; trawlers, Ilfracombe.

„ chartacea. Trawlers, Ilfracombe.

„ avicularis. On Flustra foliacea, trawlers, Ilfracombe; on Eschara foliacea, Budleigh-Salterton.

Salicornaria fasciminioides. Fine on Slapton Sands, and brought in abundantly by the trawlers at Plymouth and Ilfracombe.

Alcyonidium gelatinosum. On the Warren, Exmouth; the beach, Dawlish; very abundant on the Slapton Sands; on the beach, Wildersmouth, Ilfracombe, and from the trawlers, Ilfracombe.

Serialaria lendigera. At times abundant beneath the Hoe, Plymouth; parasitical on Halidrys siliquosa.

Bowerbankia imbricata. On the beach to westward of Dawlish. It is most abundant growing on Fucus serratus in the Salcombe Estuary, two or three miles towards Kingsbridge.

PS. In the former paper, I made some remarks on the Plymouth trawlers, as to their overcharge for the refuse of the trawls, and I spoke of it as worthless rubbish; perhaps I was not justified in this remark: the larger portion of the refuse of the trawls consists of fine specimens of Antennularia ramosa; amongst it may also be found the crustaceous Atelecyclus heterodon, and, in the Echinodermata, beautiful specimens of scarlet Goniasters.

WILLIAM F. TEMPLER.

Oban, Argyleshire,
December, 1854.

On the Corporeal Sensations of Insects. By OCTAVIUS PICKARD-CAMBRIDGE, Esq.

THE accusation of deliberate cruelty that has, by many humane and well-meaning persons, been cast upon the prosecution of the science of Entomology generally, and upon collectors of insects (who are not necessarily "entomologists," in the true meaning of the term) especially, has by different friends been so urged against me, an almost enthusiastic lover of the study and collection of this order of creation. Although, from the earliest period of my collecting, convinced of the comparative immunity of insects from what we call pain, and subsequently strengthened in that conviction by observations both in Entomology and other branches of Natural History—which is also probably the case with most entomologists who have at all directed their attention to the point—still I venture to put forth the following considerations on this subject, hoping that more experienced physiologists than myself will add to them the results of their researches, and that they may tend to remove from the minds of non-entomologists the idea of our being unnecessary and merciless inflictors of pain upon creatures, by their defenceless state entitled to our protection and support.

I will here first premise what I think all will agree in, that, even supposing pain to be inflicted, there is no class of men who show more real regard for the well-being of insects than true entomologists. Just observe the different modes of treatment to which these creatures are subjected by those who are and those who are not entomologists! the former, from a study of their habits, economy and position, as instruments in the great scheme of creation, are so deeply impressed with their importance, that, save specimens for the purpose of study (and these it is their great object to deprive of life by the speediest possible method), they are most jealous of the wanton destruction of a single insect; and to see these creatures, in the full enjoyment of life and vigour, performing their allotted part in the system of nature is an entomologist's most delightful occupation, while one who has not made them the subject of study and observation may perhaps have some vague idea of their being for some good purpose, inasmuch as "in wisdom they were all created," though more commonly but little really impressed by such a consideration, looks upon insects, at least those with which he is more immediately brought in contact, as wholly noxious and troublesome, and the unfortunate wasp, spider, caterpillar or other creature, is crushed with no more heed to its use or feelings than if it were a blade of grass; and if taxed with thoughtless cruelty, he tells you, as I have been frequently told, that it does not matter, seeing they are certainly not responsible creatures.

I have not here made any mention of the destruction of really noxious insects; but when any species is proved to be a real pest there is no one more ready or more qualified to aid in its removal than an entomologist; and, indeed, it is to him, almost without exception, that mankind are indebted for the discovery of many minute and destructive insects, and the means of exterminating, or, at all events, keeping them within due bounds; and, on the other hand, it is not unfrequently his pleasant office to rescue some inoffensive creature from undeserved obloquy and consequent immolation, on account of some fanciful injury or ignorant prejudice: this has happened to myself several times; once in particular when, hearing that, in a neighbouring parish, a farmer had caught and secured the "cause of the potato disease," I made inquiries, and was able to save from destruction and unmerited reproach sundry larvæ of the death's-head (*Acherontia Atropos*). Again: not long since, on showing an old gamekeeper a large box of the larvæ of the emperor moth (*Saturnia Pavonia-minor*), his exclamation was, "Lor, sir, they be poisonous!

I do always put my foot on 'em, and zao I do kill 'undreds o' 'em on the heath;" but its habits and transformations having been shown and explained to him, he was much struck, and promised to cease his thoughtless warfare.

But, after all apology has been made for entomologists, it must be admitted that they have a double character, one as "collectors," the other as "true investigators:" numbers there are merely of the former, who collect either for the sake of possessing some rarity or for having a fine series of beautiful objects, or for the excitement and difficulty of their capture: numbers, again, combine all this with a true love and admiration of them as creatures and as a scientific study. Many, again, collect for all the above reasons, and the additional one of making a profit by their sale, while many do so for the purposes of profit alone; all these motives are justifiable, and those who collect for any of the above reasons, other than for study, if of an intelligent disposition, are, from the necessary observations they must make in their pursuit, in a fair way to become in time something more than mere collectors; and, in fact, I doubt whether all entomologists cannot trace their present love of the science to some of these motives.

I might here (and it would be, indeed, a pleasant task) trace the general tendencies of the study of insects on the minds and habits of its devotees, and the numberless moral lessons, unheeded by those who neglect the wise man's command, "Go to the ant, thou sluggard, consider her ways, and be wise," that this study forcibly impresses us "that the works of the Lord are great," and that the sanction immediately following "sought out of all them that have pleasure therein," is peculiarly applicable; but my object now is but to show cause against the stigma of cruelty attaching to the pursuit of Entomology, by considering whether insects feel what we call "pain," in anything like the degree appreciable by ourselves or other warm-blooded animals, under similar inflictions or laceration of their parts: and here the question arises, "What is pain?" which I define to be "Unpleasant sensations experienced by living organized creatures on violence being offered to their parts." Sensation, from all we can find out by observation, is the peculiar result of a living nervous organization; it is not of necessity connected with life, for in that case all the vegetable kingdom may lay claim to it, and if we exclude this portion of creation from its influence, where, between it and the animal kingdom, is the line to be drawn, on one side of which is sensation and the other side none? Thus, sensation may be defined

as the "perception of the organs of sense," which are so constituted as to inform their possessor of the contact or proximity of external objects, and the perceptions so excited may be either pleasurable or the contrary—*i.e.* may produce either pleasure or pain.

As to the degree in which these sensations are felt by animals other than man we can have no direct evidence, and can therefore only reason on them by analogy: thus, we find that certain inflictions produce certain effects on man; the like inflictions produce pretty similar results on all animals possessing a warm-blooded nervous organization similar to man, and as we are assured by man that such inflictions on him are accompanied by certain peculiar unpleasant sensations, *i.e.* by pain, I think we may not unreasonably conclude that such sensations, differently modified in some cases by other principles intervening, are also the results of the like inflictions on those similarly constituted animals. I am aware that this is but a presumption in favour of all warm-blooded animals possessing the same corporeal feelings; but it is still a fair presumption, although we know that many similar injuries do occasionally produce very different degrees of pain, even on different individuals of our own species, and, therefore, as we cannot infallibly deduce any particular amount of pain from any particular injury on one species of a large class, still less can we do so in reference to all the species of that class: however, the general truth of the proposition will, I think, be granted.

Passing on, then, to animals of a very different organization, still nervous but with a circulation of cold fluids, such as reptiles and fishes, we find that similar inflictions produce on them by no means the same results as on warm-blooded animals: a tortoise has been known to live four months after deprived of its brain, and without showing any symptom of suffering (see Dalzell's Introduction to translation of Spallanzemi, p. 45). Neither are insects or worms, likewise of a cold circulation, affected by injuries in anything like the degree that warm-blooded animals are: thus, once when out walking I had captured one of the largest species of dragon-fly, and after nipping the thorax pretty sharply, and apparently killing it, I pinned it to my walking-stick with a pin, the size of which, compared with the present entomological pins, was quite a lark-spit; however, after carrying it in this way for about half an hour, it began to flutter as violently as if totally uninjured, and disengaging itself from the stick, flew straight away, pin and all, at a considerable height in the air, until I lost sight of it in the distance. More recently I had taken

a beetle, Lacanus parallellopipedus, and after immersing it for a few moments in scalding water, it being apparently quite dead, I pinned it to a piece of cork, and placed it in an open drawer to dry; two days after, missing it from the cork, I searched high and low, but could not find it, until at last it was found crawling away, with the pin still in it, at a distance of several yards from the drawer. Could we, or any other warm-blooded animal, have performed this, after a similar infliction? Again, it is well known that some species of moths may be pinned to a tree while at rest during the day, and appear to know nothing of the matter, for aught we can tell from any movement they make, until their usual period of flight arrives, when vain efforts are made to regain their liberty, and the only apparent inconvenience is the being *fixed* to the spot (see Introduction to Westwood and Humphries' 'British Butterflies,' &c.). I have myself witnessed similar instances, though at this moment I forget the species.* I have also seen a hornet (*Vespa crabo*) severed at the junction of the thorax and abdomen during a voracious repast on a pear, but this injury did not for some minutes appear to interrupt its enjoyment of the meal, and even when aware of its loss the only effect seemed to be the prevention of flight by the absence of the natural balance of its body. Is it, then, agreeable to our knowledge and ideas of the effect of pain to suppose that if, in any of these instances, there had been felt what would certainly have been our sensations under such injuries, they would have taken it so quietly and unconcernedly, and with scarcely more apparent feeling than would have been visible in a vegetable? and would not the physical effect of such maltreatment on ourselves have been to produce speedy, if not instantaneous, death? and if, therefore, we find injuries and violence to their parts producing on insects and warm-blooded animals such very dissimilar results, shall we not be justified in concluding that their feelings on these occasions are also of a very dissimilar nature?—that is, if a total dissimilarity of organization produces, as far as direct evidence goes, totally different effects, may we not reasonably conclude that the difference is kept up even as to those effects of the precise amount of which we have no direct evidence? there appears to me, at all events, a strong presumption in favour of such a conclusion.

Again, there are some parts of our own bodies that are sensitive in very different degrees from other parts; and some, again, such as those

* I have just had a striking instance of this with a number of small specimens of P. Populi.—O. P.-C.; December 10, 1854.

easily reproduced, the hair, nails and teeth (to a certain age), in which there is no feeling whatever, neither is there in the bones, and this shows that pain and the living material of nervous organizations are not necessarily connected; nor does the fact of pain in these parts, in a disordered or diseased constitution, affect this conclusion. Now, some insects, as the daddy-longlegs (*Tipula pectiniformis*), probably most species of spiders and some moths—I have witnessed this power in the angleshades (*Phlogophora meticulosa*)—part with their legs voluntarily on provocation or excitement, accompanied with but very little force: crabs, lobsters, and probably other species of that order, have the same power, and so independent appear to be these parts that their possessors, or rather losers, not only seem not the least concerned at the loss, but, as is the case with our hair and nails, these portions of their bodies are—in the case of crabs and lobsters, to my own knowledge—reproduced in due time: the slow-worm (*Anguis fragilis*) also, and lizard (*Lacerta agilis*), by muscular exertion, can throw off portions of their tails, which I have every reason to believe are reproduced.* There is, then, an analogy, in this respect, between such parts of the lower animals and the independent parts of man, and it seems reasonable thence to infer that the respective sensations in these corresponding parts are similar. There appears to be a sort of graduated scale in the comparative value of these independent parts in the different orders of animals, though, in all, they are the parts least essential to actual existence: thus, in the highest orders, the hair and nails; in the next, or cold-blooded, as reptiles, portions of the tail; in Crustacea, Arachnida and insects, more important parts, as legs and wings; lower again, as in worms, any portion may be cut off, and the head will be in full existence; and, lowest in animal order (the Polypi), are still less sensible to maltreatment; whence we pass, by insensible degrees, to the vegetable kingdom, in which scarce any amount of deprivation of parts, at the right seasons, appears to affect the vital energy. But as the above analogy, if granted, would only point to a probable immunity from pain in the limbs, &c., and their peculiar sets of nerves, and not in the body, where the principal nerves and matter are collected, I will notice another thing, which would apply equally to the whole of the insect; man and other warm-blooded animals may be viewed, in a general way, as composed of a mass of organized matter interspersed with nerves, all of which centre in one place—the

* In Mr. Gosse's work on Jamaica he has found this *is* the case with a species of lizard he met with there.

brain—this mass of matter enclosing and supported upon a framework of bones, while insects, Crustaceans and Arachnida may be defined as a collection of nerves not centreing in one point, but with different centres, which, conjointly with other organs and a small amount of organized matter and juices analogous to the flesh and blood of warm-blooded animals, are enclosed in a case more or less solid, in some a mere cuticle, but in others horny, as in beetles, or as crabs and Mollusca, whose shells are as hard or harder than any bone: in other words, the one have the bones *inside* and the other the bones *outside.* Now, man's chief seat of feeling is in the softer parts, and those principally outside, that is, on the external surface of the body; he has little or no feeling in the substance of the brain or medullary matter, as the marrow, which flows from the brain, nor has he in the substance of his bones or hard outer cuticle, or in the mass of his flesh or in his blood. Why, then, should it be supposed that those animals which consist chiefly of these parts, namely, nervous matter, organized matter analogous to flesh, juices to blood, and hard cuticle to bone, and have none of that peculiar organization which we see in ourselves necessarily concomitant with acute feeling—why should it be supposed that they feel more pain than is experienced in analogous parts of warm-blooded animals?

Again, it is certain that the lower the temperature of our bodies the less sensibility is there in them; and, it being certain that the temperature of the animals under consideration is by nature greatly below that of ourselves, it appears to me fair to conclude from it that their comparative sensibility is, in consequence, much less than ours: also, from the fact, that what used to be the most painful operations in surgery can now, by Mesmerism or magnetism and other means, be rendered entirely painless, we see not only that life, simply, and sensation are not necessarily connected, but that neither are a nervously organized life and sensation; and proves, moreover, that, under certain conditions of existence, animals can be actually without corporeal feeling. Whence I do not think it will be considered presumptuous to throw out, as a speculation, the idea that insects may be devoid of acute corporeal feeling, from the operation of magnetism, or some other such agent, acting on them under purely natural laws.

It is, *à priori*, an argument in favour of a very different degree of corporeal feeling among the different orders of animals, that others of the external senses are very variously experienced; smell and taste, for instance, and even the sense of hearing. Who doubts that the sensations of an animal who greedily devours putrid meat or drinks

from a stagnant pond are, in respect of the sense of taste, widely different from those of one who revolts at the mere idea of such a repast? And so of hearing; who will say that the senses of hearing of an animal on which no sounds seem to make any, far less a pleasant impression, and of one who is ravished or painfully annoyed by certain sounds, are the same? It may be said that insects have no organs of hearing and tasting, whereby they could appreciate things in the way other animals do, and therefore it *proves* nothing; but, allowing this, in either case it shows how widely dissimilar in every material particular, in these respects, different creatures are, for if *one* sense is wholly wanting, why may not another be? and if the same cause produces pleasure on the one hand and disgust on the other, can their respective sensations be the same?

Let us look at the matter in another point of view: it is certain that impaling alive for a length of time and then being released, and many other severe injuries, loss of legs, wings, &c., have no permanent bad effects on insects, neither ultimately destroying nor suspending the main objects of their existence (multiplication of the species being among the chief), and, as I have noticed above, even the loss of the whole abdomen was not at first perceived, and would not for some time have been fatal, and, if this is so, is not the *sole*, or, at all events, the *principal* reason, as far as we can trace cause and effect, for their being endowed with acute corporeal feelings absent? Such injuries would be, many of them, instantly fatal to warm-blooded animals, and, at any rate, most of them would materially interfere in the carrying out the lot appointed them in the scheme of nature. So here we find as, in tracing out the workings of a benevolent Creator, we should expect to find that such animals are endowed with senses of such a delicacy and acuteness as may warn them at once, on the slightest injury, to avoid the threatening calamity. I conceive, therefore, that it would be to the last degree irreconcileable with what we *know* of the universal benevolence of God in the creation, to suppose that, without apparently any sufficient reason, myriads on myriads of His creatures, placed in situations peculiarly liable to injury and exposed to violence beyond all others, witness the thousands trodden under foot at every step we take, or destroyed in operations of gardening and husbandry, not to mention the countless swarms, the main end of whose creation appears to be to suffer a violent death, in being devoured as the appointed food of other animals—would it, I say, be reasonable to suppose that these orders are endowed with acute corporeal feelings?

With many persons, I am aware, it is sufficient proof of an acute

feeling of pain in insects, that when impaled they often struggle violently and writhe themselves about, but I believe it is well known (I have experienced it myself over and over again) that moths and beetles, and other insects, may be impaled when at rest and show no knowledge of it, but take hold of the pin and remove the insect from its position, and it will struggle and writhe immediately; replace it, so that its feet may again have a firm hold, and it is perfectly quiet; and this is sufficient to show that no argument can be drawn from the fact of struggling and writhing, since these are evidently excited by some other cause, and are not therefore necessarily connected with pain. Again, it is well known to collectors that when insects still alive are pinned in the collecting-box, a cool situation will keep them perfectly quiet for any length of time, but bring them into a warm atmosphere, and all their wings are set fluttering immediately, though some, and I may particularly mention Eulepia cribrum as an instance, will not move, either in a cool or warm position, until their time of flight arrives. No one will, I think, argue from this that the temperature affects their *feelings;* the simple explanation of the circumstance appears to me to be that their muscular activity alone is instantaneously awakened or lulled by changes of time and temperature, in this their impaled state, as we know it is in their state of liberty. If a warm atmosphere were *essential* to the activity of insects, it would afford ground for supposing that other properties and senses, as feeling, &c., might also be awakened by it; but it is *not* essential, for some species C. Brumaria, for instance, may be seen in a state of the greatest activity during the coldest nights of winter. Nor am I aware that any degree of cold or heat raises or lowers the temperature of the insects themselves, though this is a fact which requires experiment to put it beyond doubt. Bees, indeed, it is well known, generate a considerable degree of warmth, even in the depth of winter, but this also is a fact now, I believe, unaccounted for.

I have thus set down in a cursory way, and without attempt at any methodical arrangement, the considerations which appear to me to lead to the irresistible conclusion that insects, and many others of the lower orders of the Creation, but insects especially, are by no means susceptible of the acute corporeal sensations that man and other warm-blooded animals undergo. In recapitulation, therefore, of these considerations in a more regular order, it appears that—

First, from a comparison of the effects, both physical and as shown by outward demonstrations of inflictions and injuries on warm-

blooded animals, taking man as their type, and cold-blooded animals, insects in particular, as serving our present purpose, it seems impossible to conclude that their respective corporeal sensations are *in any degree similar*, but, on the contrary, the comparison points to the *most extreme amount of dissimilarity.*

Secondly, from a state of coma, induced by magnetism, being favourable to insensibility of pain in ourselves, it is evidently *not absurd* to suppose insects devoid of feeling, since they may possibly be by nature under some such influence.

Nor, thirdly, is it absurd to suppose them *devoid* of, or at any rate with *but a very low state* of the sense of feeling, since many like senses are in other creatures of such different intensity, and probably some senses occasionally absent altogether, or recompensed by others totally different!

Fourthly, from a comparison of the ultimate effects of injuries on the different orders of creation, the chief reason for being endowed with acute feelings appears, from considerations also of divine benevolence, to be absent, and therefore it does not seem *unreasonable* to conclude the absence of such feeling!

Fifthly, from the fact of a high temperature of body being connected with sensibility in ourselves, its absence would appear *to show a want of sensibility* in insects!

Sixthly, from a physiological comparison of their composition and internal and external organization with that of other creatures, it is *highly probable* that insects have *little or no feeling* whatever.

Seventhly, from a consideration of the circumstances connected with the struggling and writhing of insects impaled alive, it would *not be reasonable to connect it with* an acute sense of feeling.

I have given no authorities for any physiological positions I may have advanced, for what I have now written has been in the absence of works on the subject to which I could refer, and is therefore chiefly from recollection of former reading and personal observations, so that should there be any erroneous or dogmatic assertions I shall be too happy to have them pointed out and corrected; and, in fact, my principal reason for broaching the subject at all is to invite discussion, and to endeavour to draw forth the opinions of good scientific anatomists and physiologists.

I fancy now that I hear some one say that it will prove anything but a boon to the insect world to show them to be destitute of acute feeling—that the thoughtless will have no reason to be more thought-

ful, and the humane, having none of the pangs of apprehended *cruelty*, will lose their chief inducement to treat them well; but I myself have no fear of any such result: that the thoughtless may be thoughtless still is very probable, but the humane, being spared the pangs of inflicting pain will be not only able, but hundreds will be induced who before would not hear of such a thing, to study these creatures closely, without fear of being disgusted, and it is from their being made a general object of study and investigation that I anticipate for them a thoughtful and lenient treatment, and I think I may even assert that the thoughtless in these matters are now but few and far between, and likely to become still fewer: on the other hand, if what I have said shows anything it shows that an enormous number of animated beings are still gifted with an acute sense of pain; so that there is no fear of deadening in the human mind, for want of exercise, the beautiful sentiments of mercy and pity, which will now be the more forcible as they will be less misdirected.

OCTAVIUS PICKARD-CAMBRIDGE.

Hatch Beauchamp, Taunton,
November 3, 1853.

PS. Seeing that the subject of *cruelty* to insects is mentioned in a paper on 'Killing Insects,' by G. B. Buckton, Esq. (Zool. 4503), who notices the disinclination of writers to broach the subject, I trust the present paper (written, as may be seen by the above date, last autumn) will be received as the first stray shot fired from the hitherto-silent fortress, to be followed up by the heavy batteries of other more skilful marksmen. One or two other facts mentioned by myself are also noticed by Mr. Buckton, but the different dates of our papers preclude any idea of intentional plagiarism; I think it also but fair to myself to state that I have never read it, nor was I before aware of Messrs. Kirby and Spence's treatise upon this subject, as mentioned by Mr. Buckton.

O. P.-C.

Bloxworth House, November 30, 1854.

[I could not have admitted Mr. Pickard-Cambridge's paper after peremptorily closing the brilliant but too extended discussion on the same subject, contained in the early volumes of the 'Zoologist,' had that gentleman reopened the question then at issue, but his observations appear too general to invite reply.—*E. Newman.*]

NOTICES OF NEW BOOKS.

'*The Zoology of the Voyage of H.M.S. Herald, under the command of Captain Heury Kellett, R.N., C.B., during the years* 1845—51.' Published under the authority of the Lords Commissioners of the Admiralty. *Reptiles and Fish.* By Sir John Richardson, Knt., C.B., M.D., F.R.S. Part III. Royal 4to, 32 pp. letter-press, 7 Plates. *Price* 10*s.* 6*d.*

We have already expressed our inability to understand the plan of this beautiful and expensive work; we therefore address ourselves only to the contents of the portion before us, of which we give a synopsis, without pretending to have made any discovery as to the scope, design or arrangement.

Osteology (continued).—Mastodon? p. 141; Elephas primigenius, p. 142.

Reptiles.—Lophosaura Goodridgii, *Gray*, p. 143, Tab. XXVI.; Craniosaura Seemanni, *Gray*, p. 148, Tab. XXV.; Gecko Reevesii, *Gray*, p. 151, Tab. XXVII.

At p. 155 we learn that other species of reptiles and batrachians were collected on the voyage; a list of fourteen is given, among which occur "Rana, nova species from Canton;" "Gecko, near Naultina, from the Island of Gorgona, Coast of Peru;" "Rana, nova species from Mazatplan;" "Grammatophora and Emys scabra, from same locality, not marked. Likewise upwards of fifty species of snakes:—Crotalus, Dendrophis, Boa, Pelamis, &c., from various places, but chiefly from Western Mexico," p. 156.

Here are the indications of important and valuable additions to our Reptile Fauna, and we look forward with high anticipations to the publication of these novelties in that elaborately minute and wonderfully accurate style for which Sir John Richardson is so deservedly celebrated: we have no notice as to the date of publishing these details, but the author proceeds, on the same page on which the exciting announcement is made, to

Fish.—Anchisomus geometricus, p. 156, Tab. XXX.; Anchisomus angusticeps, p. 159; Anchisomus multistriatus, p. 160, Tab. XXIV.; Anchisomus reticularis, p. 161, Tab. XXXI.; Platessa stellata, p. 164, Tab. XXXII.; Platessa glacialis, p. 166, Tab. XXXII.; Salmo

consuetus, p. 167, Tab. XXXIII.; Salmo dermatinus, p. 169, Tab. XXXIII.

'*Transactions of the Linnean Society of London.*' Vol. XXI., Part III. 4to, 58 pp. letter-press; 5 plates. *Price* 12*s.*, *to Members gratis.*

This Part contains the following papers:—

'Notes on the Vegetation of Buenos Ayres and the Neighbouring Districts.' By Charles James Fox Bunbury, Esq., F.R.S., F.L.S., &c.

'On the Genus Aquilaria.' By the late William Roxburgh, M.D., F L.S., &c., with Remarks by the late Henry Thomas Colebrooke, Esq., F.R S., F.L.S., &c.

'On Acradenia, a New Genus of Diosmeæ.' Ry Richard Kippist, Esq., Libr. L.S.

'On the Genus Myrmica and other Indigenous Ants.' By John Curtis, Esq., F.L.S., &c.

'Note on the Elatus of Trichia.' By Arthur Henfrey, Esq., F.R.S., F.L.S., &c.

'Note on the Genus Ancistrocladus of Wallich.' By G. H. K. Thwaites, Esq., F.L.S., &c.

'Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera.' By John Curtis, Esq., F.L.S., &c.

'On the Osteological Relations observable among a few Species of the Bovine Family.' By Walter Adam, M.D.

'*The Annals and Magazine of Natural History.*' Nos. 83 and 84, dated November and December, 1854; *price* 2*s.* 6*d. each.* London: Taylor & Francis, Red Lion Court, Fleet Street.

No. 83 contains the following papers:—

'Contributions to the Natural History of the Infusoria.' By A. Schneider. [Extracted from Müller's Archiv. for 1854, p. 191.]

'Zoosperms of Spongilla.' By H. J. Carter, Esq.

'On the Genus Lycium.' By John Miers, Esq., F.R.S, F.L.S., &c.

'On the Occurrence of the Bottle-headed Whale (*Hyperoodon bidens*, Flem.), and Remarks thereon.' By William Thompson, Esq.

'On the Primitive Diversity and Number of Animals in Geological Times.' By L. Agassiz. [Extracted from 'Silliman's Journal' for May, 1854.]

'Memoranda of Observations made in small Aquaria, in which the Balance between the Animal and Vegetable Organisms was permanently maintained.' By Robert Warington, Esq.

'On a Mode of giving Permanent Flexibility to Brittle Specimens in Botany and Zoology.' By Professor J. W. Bailey, U.S. [Extracted from 'Silliman's Journal' for July, 1854.]

Bibliographical Notice:—A Manual of Natural History, for the Use of Travellers; by Arthur Adams and others.

Proceedings of Learned Societies:—Zoological.

Miscellaneous:—On the Natural and Artificial Fecundation of Ægilops by Triticum; by M. Godron [extracted from the 'Comptes Rendes,' July 17, 1854, p. 145]. The Ounces; by Dr. J. E. Gray. The African Seal (*Heliophoca atlantica*); by Dr. J. E. Gray.

The papers contained in No. 84 are as follow:—

'Remarks on Associations of Colour, and the Relations of Colour and Form in Plants.' By G. Dickie, M.D., Professor of Natural History, Queen's College, Belfast.

'On Linaria Sepium of Allman.' By C. C. Babington, M.A., F.R.S., &c. [From the 'Transactions of the Botanical Society of Edinburgh.']

'Characters of Four Indian Species of Cyclophorus, *Montfort*, followed by Notes on the Geographical Distribution of the Genera of the Cyclostomacea in Hindostan.' By W. H. Benson, Esq.

'Description of a New Bivalve Mollusca.' By H. and A. Adams.

'On Artificial Sea Water.' By Robert Warington, Esq.

'On the Genus Mermis.' By Dr. G. Meisner. Analysis by Dr. W. J. Burnett. [From 'Silliman's Journal' for July, 1854].

'On the Fecundation of the Coniferæ.' By Dr. W. Hoffmeister.

Proceedings of Societies:—Royal—Zoological—Botanical of Edinburgh—Linnean.

Miscellaneous:—Note on Alpheus affinis; by W. V. Guin, F.G.S. On a New Species of Rock Kangaroo; by Dr. J. E. Gray.

'*Transactions of the Entomological Society of London*.' New Series. Vol. III., Part 3. Demy 8vo., 48 pp. letter-press; 2 plates. *Price* 2*s.* 6*d.* London: Longman. 1855.

This part contains the following papers:—

'Descriptions of four New Species of Beetles belonging to the Family Paussidæ.' By J. O. Westwood, Esq., F.L.S., &c.

'On some of the Difficulties of Entomological Students, as exemplified by recent experience in the genus Elachista.' By H. T. Stainton, Esq.

'Description of a New Genus of Coleopterous Insects inhabiting the Interior of Ants' Nests in Brazil.' By J. O. Westwood, Esq., F.L.S., &c.

'Essay on the Genera and Species of British Formicidæ.' By Frederick Smith, Esq.

This is a valuable and interesting part, and one which will be particularly acceptable to the British Entomologist.

Birds in the Neighbourhood of Blackheath in 1854.—The following indigenous birds commenced their song in this order:—

Robin, *Erythaca rubecula*, Jan. 1.
Thrush, *Turdus musicus*, Feb. 5.
Chaffinch, *Fringilla cœlebs*, Feb. 6.
Wren, *Troglodytes Europæus*, Feb. 7.
Sky Lark, *Alauda arvensis*, Feb. 12.
Yellowhammer, *Emberiza flava*, Feb. 26.
Greenfinch, *Coccothraustes chloris*, Feb. 28.
Bunting, *Emberiza miliaria*, March 3.
Blackbird, *Turdus merula*, March 5.

Some of these birds were rather late in commencing their song, owing perhaps to the very severe weather at the beginning of the year. The redbreast sang bravely through all the winter frost and snow: of the rest, the chaffinch and wren commenced with a weak ditty something like the autumnal song, while the others were tolerably "strong in song" from the first.

Summer Birds of Passage, with the dates of their appearance.

Chiff-chaff, *Sylvia hippolais*, April 3. Love Lane, Lee.
Willow Warbler, *Sylvia trochilus*, April 10. Elmstead.
Tit Lark, *Anthus arboreus*, April 11. Plumstead.
Blackcap, *Curruca atricapilla*, April 11. Plumstead Common.
Redstart, *Phœnicura ruticilla*, April 13. Greenwich Park.
Whitethroat, *Curruca cinerea*, April 14. Annerley.
Wryneck, *Yunx torquilla*, April 15. Abbey Wood.

Sand Martin, *Hirundo riparia*, April 15. Beckenham.
Swallow, *Hirundo domestica*, April 15. Sydenham.
Nightingale, *Philomela luscinia*, April 16. Love Lane, Lee, and Abbey Wood.
Sedge Warbler, *Salicaria phragmitis*, April 16. Near Burnt-Ash Farm.
Martin, *Hirundo urbica*, April 17. Kidbroke.
Grasshopper Lark, *Salicaria locustella*, April 17. Shooter's Hill.
Cuckoo, *Cuculus canorus*, April 30. Dartford Heath.
Wood Warbler, *Sylvia sylvicola*, May 3. Greenwich Park.
Whinchat, *Saxicola rubetra*, May 4. Farm Lane, Lee.
Lesser Whitethroat, *Curruca sylviella*, May 5. In my own garden.
Spotted Flycatcher, *Muscicapa grisola*, May 6. Greenwich Park.
Swift, *Cypselus apus*, May 18. Wimbledon.

It appears to me that some at least of these birds commenced singing on the day of, or the day after, their arrival: such was especially the case with the willow warbler and the redstart. On the day I first heard them my attention was only arrested by two or three weak notes, which was all I heard, and that from only a single individual of each species; and yet there could be no mistake, for, singular to say, on the following morning every grove was resonant with their voices. I was particularly struck with these two cases, and only less so in the case of other birds. It seemed as though they arrived in song, but the fatigue of the journey rendered it necessary for them to rest a few hours before giving utterance to their buoyant feelings.

It is to be remarked, in reference to the foregoing list, that the weather in the first half of the month of April was bright and warm, but towards the 19th or 20th it changed to dull and cold, and every one must recollect the very severe night of the 23rd. This checked the influx of our summer visitors for a time, and, although up to that period fresh arrivals were taking place every day, a fortnight elapsed, during which Nature retrograded and the remaining birds wisely kept aloof.

I was unfortunately not in a position to note the cessation of the summer song with any accuracy; but I observed that the following birds recommenced their song later in the season:—

Blackbird, *Turdus merula*, Aug. 4.
Robin, *Erythaca rubecula*, Aug. 5.
Willow Wren, *Sylvia trochilus*, Aug. 23.
Blackcap, *Curruca atricapilla*, Aug. 30.
Chiff-chaff, *Sylvia hippolais*, Aug. 31.
Wren, *Troglodytes Europæus*, Aug. 31.
Starling, *Sturnus vulgaris*, Sept. 1.
Swallow, *Hirundo domestica*, Sept. 1.
Goldcrest, *Regulus auricapillus*, Sept. 12.
Chaffinch, *Fringilla cælebs*, Oct. 15.
Lark, *Alauda arvensis*, Oct. 18.
Thrush, *Turdus musicus*, Oct. 19.
Hedgesparrow, *Accentor modularis*, October 19.

I am much inclined to believe that, at least in the majority of instances, the birds which first begin by favouring us with their long-lost voices in the autumn are the young birds of the year; in some cases I am sure of it, from having seen the young birds themselves utter the note to which my attention has been directed owing to its having been so long silent. I do not assert that they alone sing in the latter part of the season, but I believe they are generally the first to break the autumnal silence. The redbreast is by far the most indefatigable vocalist: throughout the whole year he was silent only from July 17th to August 5th, and then the quiet was profound: for weeks together his was the only voice heard, and nothing seems to impair his powers:

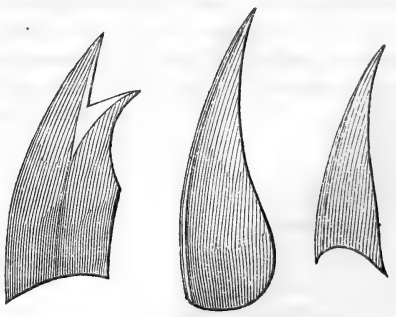
so incessant is his music that the small *recording* voices of his progeny are unheard. In conclusion, the swallow left us on the 5th of October; but nearly three weeks' afterwards, on the 22nd of the same month, I saw a single swallow flying briskly about at Auchincruive, four miles from Ayr, N. B., at 5 in the afternoon, the weather being cold, wet and inclement. — *Cuthbert Collingwood; Purley Park, Berks, December,* 1854.

Occurrence of the Snowy Owl (Strix nyctea) *in Sutherlandshire.*—About the 15th of October, 1853, the forester at Altneharrow, in Sutherlandshire, observed a very remarkable bird on Knock Stack, a high rock in the forest. He had his rifle with him, and killed what turned out to be a very fine adult specimen of the snowy owl, which is now in my collection. He says he has never seen or heard of any bird like it during the whole time he has lived at Altneharrow. It is the largest British specimen I have ever seen.—*W. M. E. Milner; Nunappleton, December* 30, 1854.

Singular Conduct in a Robin.—Some few weeks ago I was amusing myself with a common snake (*Coluber natrix*), and in order more perfectly to observe its beautiful and graceful motions I placed it on the lower branches of an apple tree. This arrangement had evidently been watched by a robin, for immediately the snake commenced climbing towards the top of the tree the robin perched himself about a yard distant from his head, and followed him closely wherever he went, occasionally venturing even within a few inches. The snake did not regard the presence of the bird, but appeared quite indifferent, while the inquisitiveness and daring of the latter were really very interesting. All this took place within a few feet of where I was standing, and, although the tree was shaken rather violently at times, the robin seemed so absorbed in the contemplation of his strange neighbour that he took no notice of my presence. May not similar occurrences have been observed in other countries, and thus have given rise to the absurd tales told of the power of fascination possessed by reptiles?—*G. Norman; Hull, December* 20, 1854.

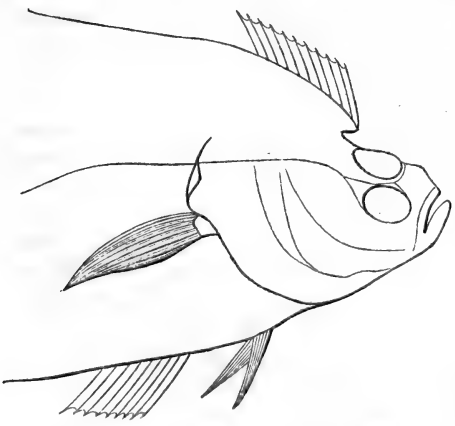
Notice of a Tunny stranded in the Estuary of the Tees.—I beg to send the following account of a very large fish, which two fishermen of Stockton found on a sand-bank in the estuary of the river Tees, in September last, and which has proved to be a fine specimen of the Thynnus vulgaris of Cuvier:—In October, 1854, I was informed that two fishermen had found a remarkably large fish, which was to them quite unknown, on a sand-bank of the Tees, where it had very recently been stranded. The description of this strange fish, as given by these men, was as follows: it had a head much like that of a salmon; the large back-fin was spiny and erect, like that of a perch; the tail was curved and spreading. The colour on the back was nearly black, but that on the under part light. I at this time received a large bony scale, which had been taken from the front of the fish, as well as a portion of the thick and smooth skin of the back, containing numerous imbedded smaller scales. From this account it occurred to me that this unknown fish was most probably a tunny, which, in its pursuit of herrings and other small fishes, had run itself upon a sand-bank, where it was left by the receding tide. Again, in the latter part of December, 1854, I obtained the following further information, from the same source in Stockton, respecting this

fish. The fishermen described the flesh on being cut as much resembling a piece of highly salted bacon, *i. e.* red with salt or saltpetre: they said its weight was "pretty well on to 60 stone," and that three strong men could, with difficulty, move it over from one side to the other. My informant had shown one of these men Mr. Yarrell's figure of the common tunny, in his 'British Fishes,' which he at once pronounced to be the identical, and to him unknown, species. He also showed me the tail, which directly confirmed my supposition of its being a tunny. This was of a very regular crescent-shape, with one-half or division exactly similar in curvature to the other: it had 18 rays in each half, = 36 in the entire caudal fin or apparatus; and between the two divisions and sides a cartilaginous keel was well defined. The width between the tips of the crescent, or from one tip of the tail to the other, I found to measure 2 ft. 8¼ in. Mr. Pennant, in his 'British Zoology,' (p. 362, vol. iii. edit. 1812) has described a large tunny, which had been captured in Inverary, when he was there, in 1769, the tail of which, he says, "was in form of a crescent, and measured 2 feet 7 inches between tip and tip." If, therefore, the wide spreading of the tail be any true or uniform character, from which an estimate of the size of the fish could be fairly taken, the Tees specimen would be evidently larger than that recorded by Pennant. I then requested my informant to inquire, when he next saw the fishermen, if they had observed any small appendages or finlets on the body, where it tapered towards the tail, as this seemed to me to be the only character wanting to decide what little doubt could remain in my mind as to the identity of the species. Next, on my third visit to him at Stockton, on January 5th, 1855, he, to my great satisfaction, exhibited to me two strips of the skin cut from the back and belly, with these finlets attached, which of course determined the species beyond all question. The number of spinous finlets or fin-like appendages on the skin from the back amounted to eight, whilst the number of those from underneath was nine; but I know not whether all of them had been carefully saved. Yet, from the descriptions of different naturalists, it is clear that these spurious finlets vary in number, for Linnæus and Fleming reckon them "utrinque octo;" Artede and Cuvier "octo seu novem;" Gronovius writes "utrinque novem;" and Jenyns "nine above and below." Also Pennant, in the Inverary specimen, makes them "eleven above and ten below." May these finlets increase in number, as the fish itself increases in size and age? Their colour was of a dirty yellow, edged with dark brown or black. Of the other fins that were at the same time shown to me I need make no mention, except indeed of the pectoral, which was remarkable from its extremity being cleft or divided, and which evidently (from the age and entireness of the strong black skin) had not been recently done, if accidentally done in its origin. The annexed diagram 1 represents its form, with the plain skin devoid of rays between the cleft, whilst 2 gives the form of the pectoral fin from Pennant, and 3 that as figured in Donovan's plate 5. The total length of this pectoral fin was 12½ inches, and the number of rays was 31 or 32, according as one, which appeared double or branched into two at a little distance from its base, be counted one or two: the



whole was covered with a black, smooth and leathery skin. Mr. Jenyns, in his specific characters of the common tunny, says (p. 362, 'Manual Brit. Vert. Animals'), the pectoral is "contained five times and a half in the entire length:" if this measure be correct, and not found to vary as the fish becomes aged, the entire length of the Tees fish would have been just about 5 feet 9 inches. I cannot, however, but think that this measure is liable to some variation, because Pennant's fish was 7 feet 10 inches long, or 2 feet 1 inch longer than the former, whilst the spread of the caudal crescent of the Tees fish was $1\frac{1}{4}$ inch wider than Pennant's These characters seem to me to require further investigation, which perhaps can only be effected in the Mediterranean, as in our own seas the tunny is so rare. The large scale, or rather osseous plate, which was taken from the corselet on the thorax of the Tees specimen, proved on measuring it to be an oval, a little more than $1\frac{3}{4}$ inch in length by $1\frac{1}{2}$ inch in width; but the small scales that are imbedded under the external leathery skin of the back are rounder, and many averaged nearly $\frac{3}{4}$ths of an inch in diameter. The disposition of these smaller scales and the great strength of the coating itself are very remarkable; and as I could find no description of them in any work on Ichthyology, I gave a brief account of them in a short communication which I made to the Linnean Society, on the 5th of December, 1854, since which time I have had the satisfaction of thoroughly identifying the species. I may observe that the only time I have seen a freshly caught and perfect tunny was in the month of June, at Palermo, when two able-bodied fishermen were carrying it on their right shoulders, the one walking a few feet before the other; but I had not then an opportunity of visiting a Tonnara and witnessing the method of catching this large and most useful fish.—*John Hogg; Norton, Stockton-on-Tees, January* 10, 1855.

Supposed New Species of Flounder.—Having lately obtained in this neighbourhood several specimens of a Platessa (flounder) which differs in many respects from the common flesus, I send a slight sketch of it. Very dark brown (almost black) on both sides. The length of the head, as to the whole length of the fish, is as two to nine; the pectoral, ventral and caudal fins are considerably longer than in the same sized specimens of Platessa flesus; but the greatest peculiarity is the deep notch, in the dorsal line, immediately behind the eye. The fin-rays in number are—D. 58; P. 10; V. 6; A. 41; C. 18. In all other respects it is similar to the common flounder. The largest specimen is about 6 inches long. I should feel greatly obliged if any of the correspondents of the 'Zoologist' would supply me with duplicates of recent and fossil fishes' ear-bones.—*Edmund Thomas Higgins; Birkenhead, December* 26, 1854.



White Specimen of the Flounder (Platessa flesus).—In his invaluable work on British Fishes, Mr. Yarrell remarks, "Varieties of the flounder occur much more commonly than those of any other species of flat-fish. I have before me, while now

writing, specimens without any colour on either side; specimens coloured on both sides; and specimens with both eyes and the whole of the colour on the left side instead of the right. Those without any dark colour on either side are albino varieties, through the transparent skins of which the colour of the blood-vessels and muscles has suggested the trivial names of rosea and carnaria to the authors who considered them species." Through the kindness of Mr. Jenner Weir I have before me a specimen of the flounder which seems to present some peculiarities: both sides are white, but the eyes themselves are of the usual colour, and without that peculiar red tinge which usually characterises albinos: there is no rosy or flesh-coloured tint on either side, and the blood-vessels and muscles are not discernible through the cuticle, so that this appears to be quite distinct from that peculiar freak of nature called albino.—*Edward Newman.*

Shell-fish burrowing into Rocks, &c.—Mr. Charlesworth * gave an account of the various theories which have been advanced by naturalists, to explain the remarkable power possessed by certain kinds of shell-fish, of burrowing into rocks, hard timber, and other substances. The hypothesis explanatory of this curious phenomenon, to which he first adverted, was that of Mr. Garner, an hypothesis which deserves especial consideration, from it being adopted by so high an authority as Professor Owen. Mr. Garner supposes that the currents of water produced by the movements of the vibratile cilia, or hair-like processes with which some portions of the bodies of shell-fish are covered, is the chief agent by which the burrows of these creatures are hollowed out. Mr. Charlesworth considers this theory untenable on two grounds: one, the extreme improbability that currents of so feeble a character as those produced by the cilia of shell-fish could sink holes in rocks of the hardest limestone, even if the excavation of these holes occupied a period of a thousand years, instead of being, as is well known, effected in a few days or weeks; the other, that of there being a limit to the depth of the burrows, for all stone-boring shell-fish leave off excavating when they have lodged themselves at such a distance from the surface of the stone as is consistent with their own security and the supply of their wants. Now the ciliary currents alluded to by Mr. Garner are in motion during the whole life-time of these creatures. If, then, these currents scoop out the holes in question, a burrowing shell-fish through life would never cease to deepen its excavation, a condition which is not found to be borne out by fact. A more generally received hypothesis, and one of much earlier origin than the above is, that shell-fish bore into stone by a rotation of their own shell, which is assumed to act as an auger or drill, and to be sufficiently hard to file away those portions of solid bodies against which the instinct of the contained animal directs it. The characters of the Pholas, a shell whose burrows may be seen at low tide on the scar at Whitby in the greatest profusion, favour this theory, since its shape is cylindrical, and its surface studded with numerous short strong spines, apparently well adapted for rasping. Mr. Charlesworth, however, could not accept the mechanical

* At the Meeting of a Natural-History Club at York.

hypothesis in connexion with the *shell* as the perforating instrument, for though it may explain the burrows made by the Pholas, it is utterly inapplicable to the case of other stone-borers, some of which, though not cylindrical, occupy excavations of the same shape as their shell, and which excavations consequently could not be scooped out by a rotatory motion of this organ, no rotation being possible; while other kinds, although like the Pholas of a cylindrical shape, instead of having the shell rough and file-like, have it covered with a delicate membrane, of such a nature that any friction of the shell against a hard substance would inevitably effect its destruction; yet this membrane is found present and uninjured on shells of this particular kind at all periods of their growth. The next hypothesis reviewed was the chemical one — that which supposes stone-boring shell-fish to secrete an acid or a peculiar solvent capable of dissolving all the various substances into which these creatures burrow, not even excepting wax, Mr. Charlesworth enumerated as difficulties in the way of accepting the chemical hypothesis, that, after repeated and most carefully conducted experiments, chemists had failed in detecting the smallest trace of an acid secretion in the skin or other soft parts of stone-boring shell-fish; that if any such assumed acid or solvent do really exist, its properties must be of a most novel and extraordinary kind, from the variety in the chemical constitution of the substances upon which it acts,—wax, wood, limestone, &c. &c.; that it would, upon this hypothesis, be difficult to understand how it is that the solvent in question does not act upon the creature's own shell, as well as upon the walls of the burrow or cell in which that shell is lodged; and lastly, as the work is carried on under water, it would be necessary to assume some provision for the application of the solvent without the accident of its dilution by the surrounding fluid, a provision which would hardly appear possible in some cases, such, for instance, as the excavations made by Gastrochæna and Lithodomus, in the highly porous substance of the common brain coral. In conclusion, the attention of the meeting was directed to the views and elaborate researches of Mr. A. Hancock, of Newcastle, bearing upon the elucidation of this long-agitated problem in Natural History. Mr. Hancock states that, upon submitting to microscopic examination that portion of the boring shell-fish designated by comparative anatomists as the "foot," he found it studded with minute crystalline bodies, upon which acids had little or no effect: hence he assumes these bodies to be silicious, and, detecting their presence in other organs of the animal besides the foot, he founds upon this and other considerations most ably treated of in his published memoir upon the subject an hypothesis that the burrows of shell-fish are formed by a mechanical process, but that the soft parts of the animal armed with these silicious studs or points are the boring instrument, not the shell. In reference to this last hypothesis, Mr. Charlesworth stated that he thought it far more philosophical than any of the theories which Mr. Hancock's predecessors in this field of research had advanced. He still, however, saw difficulties in the way of at once adopting it. Other naturalists, however, would doubtless follow the line of investigation pointed out by Mr. Hancock, and independent observations would, ere long, be forthcoming in confirmation or refutation of this gentleman's views. A highly interesting series of specimens of stones, wood and coral, showing the boring shell-fish in their burrows, were exhibited by Mr. Charlesworth in illustration of his remarks.

Proceedings of Societies.

Entomological Society.

January 1, 1855.—Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for January; by the Editor. The 'Athenæum' for December; by the Editor. The 'Literary Gazette' for December; by the Editor. The 'Journal of the Society of Arts' for December; by the Society. 'Entomologische Zeitung' for November and December; 'Linnæa Entomologica,' 9 Band; all by the Entomological Society of Stettin. Hewitson's 'Exotic Butterflies,' Parts 12 and 13; by W. Wilson Saunders, Esq. 'Transactions of the Linnean Society,' Vol. xxi. Part 3; 'Proceedings of the Linnean Society,' Nos. 52—58; 'List of the Linnean Society, 1854;' 'Address of T. Bell, Esq., President of the Linnean Society, at the Anniversary, May 24th, 1854;' all by the Linnean Society. 'Proceedings of the Literary and Philosophical Society of Liverpool,' 1853—4; by the Society. 'The Entomologist's Annual for 1855;' by the Editor, H. T. Stainton, Esq.

Exhibitions.

Mr. Douglas exhibited a living specimen of Cratonychus castanipes, *Payk.*, one of the Elateridæ, which he found a few days since in the centre of a large mass of rotten wood thoroughly permeated with fungoid matter, which he dug out of an old oak stump, and within which it lay in an oval cell, at one end of which were seen the pellicles of the larva and pupa. This species, kindly determined by Mr. Janson, has not hitherto been recorded as British, though it probably exists in most collections mixed with Melanotus fulvipes, which it greatly resembles.

Mr. Stevens exhibited a fine specimen of the male of Jumnos Ruckeri, from Darjeeling, and a fine female of Dicranocephala Wallichii, from India; both beetles out of the same collection.

Silk Felt produced by Saturnia Pavonia-media.

The President exhibited a specimen of silk produced at Vienna by the larvæ of Saturnia Pavonia-media called in Germany "Schwartzdornspinner:" he had received it through the kindness of Herr Pretsch, from whom he learned that a series of most interesting experiments were now in progress, the object being to obtain, from the labours of this insect, a silken felt impervious to water. The larvæ were confined separately in polished receptacles, from which there was no escape, and which presented no salient points that the cocoons could possibly be attached to, so that the whole stock of silk was exhausted on the smooth surface, and could afterwards be removed at pleasure. As the space allotted to each caterpillar was large and the stock of silk small, the coating was very thin, as in the specimen exhibited, but the felt was readily increased in substance by introducing a second and then a third larva, each of which readily worked on the felt manufactured by its predecessor. He did not know to what extent the experiments have hitherto been carried, but he believed they promised perfect success.

Note on Helobia impressa, Newman.

The President read the following memorandum on Helobia impressa:—

"I beg to exhibit some specimens of the insect which twenty-three years ago I ventured to describe as distinct, under the name of Helobia impressa; and I do this, not because I am now at all persuaded of its distinctness, but because the Rev. Mr. Dawson appears to have been unacquainted with the insect at the time he was preparing his invaluable 'Geodephaga Britannica.' Helobia impressa was found at a great altitude, on Ben Nevis and Ben Voirlich, by our friend Mr. Walker, and was distributed by him amongst entomologists at the time: the specimen which I beg to exhibit was captured by him. The difference between this and the common Welsh insect, Helobia nivalis, is this:—in nivalis, one interspace of each elytron, the *third* counting from the suture, is impressed with large deep foveæ; in impressa, two of these interspaces, the *third* and *fifth*, are thus impressed, giving the insect, at the first glance, a very different appearance. After having read Mr. Wollaston's admirable remarks on the effects of isolation on species, I will not presume to dwell on the importance of the character on which the species is founded, but I trust entomologists will agree with me that the subject is worthy of investigation, and that this very doubtful species ought at least to be separated from its Cambrian congeners as a named and locally isolated variety."

Improvements in Bee-hives.

Mr. Downie exhibited a model of a wooden bee-hive, containing, as he explained, several important improvements, proved by its use for the last three years. The improvements consisted of a moveable open floor with bars placed transversely to the bars of the hive, sliding above the true floor of the hive, and affording great facility for removing dead bees in winter without admitting cold air, a circumstance on which he laid much stress, as by the ordinary method of lifting the hive for the purpose of clearing the floor the bees were injured by the reduced temperature in the hive; and where the dead bees were not removed, as was too common, the effluvium arising therefrom was most prejudicial to the living bees: this winter, within a circuit of nine miles from his residence, he knew five hundred hives in which the bees had perished either from this cause or the want of ventilation. Another improvement was a set of openings below the false floor and at the top of the hive, which could be closed entirely or partly at pleasure, as occasion required, and by which the ventilation of the hive was at all times secured. The third improvement was a shallow zinc feeding-trough at the side of the moveable floor. The whole hive was surrounded by a loose wooden cover.

"*Notes on the Economy of Various Insects.*"

Under the above title the following notes, by John Curtis, Esq., were read:—

"As nothing can contribute so essentially to the advancement of the science of Entomology as a correct knowledge of the economy of insects, whether we regard their influence on the vegetable productions of the earth, or study them as a branch of Natural Science which has occupied the attention of some of the most celebrated philosophers of antiquity as well as those of our own age, I shall make no apology for laying this sketch of the habits and transformations of some species but little known, and to which I shall hope to make additions as opportunities may offer.

"In 1844 Col. Goureau contributed a memoir upon this subject to the Entomological Society of France,* full of truth and interest, and I trust the following observations may throw some light upon the early stages of various families of insects. I regret that several years have passed since many of the discoveries were communicated to me, and those facts which fell under my immediate observation were principally collected in the year 1848, in the Isle of Wight, in company with my esteemed and lamented friend Dr. Wm. Arnold Bromfield.

"*Anthemis Cotula.* Stinking Chamomile.

"On the 10th of August at least half the flower-heads around Ryde had the receptacles infested by little maggots, which ate into the solid parts, giving them a brown appearance when the florets were removed. They were cylindrical, shining and whitish, with two very minute sharp black hooks at the head. When arrived at maturity they contracted themselves, and assumed an oval form: they then changed inside the receptacle, or in cavities eaten on the surface, to oval pitchy pupæ, from which a fly (*Tephritis radiata*) emerged on the 12th of August. There were also scarlet larvæ of a Cecidomyia and various others, which evidently escaped my search from their minuteness, as from the flowers I bred the following insects:—from the 20th to the 28th August, Tephritis radiata, *Fab.*, 9 specimens; Cecidomyia, 2; Lasioptera, 3; Phytomyza lateralis, *Fall.*, 3.

"The Hon. C. Harris first detected the larvæ of the Phytomyza feeding in the receptacles of Pyrethrum inodorum.† The cocoons are elongate, cylindric, the ends rounded, with two minute tubercles at the head; they are coriaceous, but very thin, shining, and of a straw colour.

"On the 22nd of September, from the same heads, I found hatched in the box—Cochylis subroseana, *Haw.*, 1; Phalacrus æneus, *Payk.*, 1; nov. gen.? of Staphylinidæ allied to Hypocyptus; and Pteromalus, 2 species.

"*Senecio Jacobæa.* Ragwort.

"There were small and large maggots in some of the receptacles which were more or less eaten out, the cavities being blackened with the dung of the larvæ, whilst others contained pupæ.

"On the 28th of August males of Tephritis marginata, *Fall.*, hatched, and on the 30th two females came forth; also three of Cecidomyia flava, *Meig.*

"The larva of the Tephritis is elongated, fleshy and yellow, attenuated at the head, which is furnished with two minute black hooks, and two trifid ferruginous spiracles at the tail. The pupæ are oval, but curved, black and shining like polished ebony.

"*Inula dysenterica.* Common Fleabane.

"The 11th of August the receptacles had been eaten into by a caterpillar, and the space was covered with dung. This caterpillar could descend by a thread: it was

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* 'Notes pour servir à l'Histoire des Insectes qui vivent dans le Chardon penché (*Carduus nutans*),' par M. le Colonel Goureau. 2nd Series, v. 3, p. 75, pl. 2.

† Vide Curtis's Brit. Ent. fol. and pl. 393.

somewhat depressed, broadest anteriorly, the segments constricted and slightly hairy, ochreous with bright brown spots on the back, caused by the intestines shining through: the head was small, black and shining, with two black spots on the thoracic segment; the six pectoral feet were very minute, as well as the anal ones: the excrement towards the tail shone through of a green colour, and there was a spot at the tip. These, I suspect, are the caterpillars of a Tinea (*Aphelosetia? Inulella*),* two of which I bred from the flowers of the Inula on the 28th of August, and in all probability the larvæ feed on the seeds.

"On the 9th of September I bred also a female of Microgaster lacteipennis, *Curt.*; and on the 10th Pteromalus cupreus, a male, and an ichneumon allied to Trachyderma or Bassus.

"*Carduus lanceolatus.* Spear-thistle.

"On the 11th of August I found maggots in the receptacles, feeding on the seeds. They were fat, barrel-shaped, but attenuated before, shining ochreous-white; head furnished with two short black hooks, the tail with a circular ferruginous space, the lower margin pitchy, with two minute spiracles in the centre of the stern. The pupæ, which were imbedded in the woolly receptacles, were similar in form to the larvæ, being attenuated to the head and obtuse at the tail, and of an ochreous or rusty colour. From these, on the 4th of October, I bred a female Tephritis pallens, *Wied.*, and afterwards four males and eight more females.

"*Juncus glomeratus.*

"Dr. Bromfield frequently found, attached to the bundles of seed-vessels, whitish cases in which the larvæ of some species of Coleophora had lived, and from which the moths had hatched about the third week in August, but most of them produced a minute dark green parasite of the family Chalcididæ, which prevented my ascertaining the name of the moth: possibly it is the Porrectaria leucapennis of Haworth, or the Coleophora cæspititiella of Zeller.

"*Artemisia maritima.* Sea Wormwood.

"At the end of September, 1852, I bred from this plant two specimens of a minute Cecidomyia? and a still smaller Entedon.

"*Pistacia Lentiscus.* Mastic.

"During my sojourn at Nice, in Piedmont, in 1850—51, I frequently found upon the Pistacia bushes, which grow wild on the rocky hills near Nice and Villafranché, galls attached to the midrib of the leaves, as large as scarlet bean seeds and somewhat of a similar shape: they were very plump, of a pale green colour, more or less rosy from being marbled with red. In the early part of December I opened and examined the contents of these galls, and found them to contain an Eriosoma, very like E. bursaria, *Linn.*, but larger, and also the pupæ of an Agromyza, rather larger than Phytomyza lateralis. It was of a cinereous tint, as if dusted with the white powder which enveloped the Eriosoma; the face white; antennæ black; legs ochreous; the thighs

* "Vide my description in the Ann. and Mag. Nat. Hist., 2nd Series, v. p. 117.

dark, tipped with ochre. I will name this provisionally Agromyza Pistaciæ. A Pteromalus also issued from the galls, no doubt a parasite of the fly.

"I once saw, on a lawn at Wilton, the larva of some genus of this family carrying off an earthworm several times its own length; and last May a gentleman near London caught a similar larva holding fast to a worm by its strong mandibles.

"After heavy rains I have observed the Carabus glabratus, *Fab.*, on the mountains in Yorkshire, emerge from their hiding-places and seize earthworms in their jaws, running off with them readily enough.

"The following species have been observed or reared from the larvæ by F. J. Graham, Esq., F.L.S.:—

"Helobia brevicollis, *Fab.* In turnip-fields, where the larvæ form cells about two inches below the surface, communicating with the surface by a vertical shaft.

"Malachius bipustulatus, *Linn.* Bred from an ash stump. It has also been reared from the stalks of an Echium by M. Vallot; and M. æneus, *Linn.*, has been obtained by M. Perris from stubble, where it undergoes its transformations. The larvæ are carnivorous.

"Elater longicollis, *Fab.* Reared from a pupa found in his garden at Cranford. The exuvia of the larva exhibits a structure of the tail somewhat like that of E. murinus? viz., with a denticulated margin and two horny processes at the apex.

"Pezomachus agilis, *Fab.* Females of this ichneumon and Microgaster annulipes? were bred from the same bundle of cottony cocoons, and I have more than once observed the same fact. It may be inferred that the Pezomachus is the parasite of the Microgaster, yet it is possible their larvæ might inhabit the same caterpillar and the whole spin up together, for Ratzeburg has bred P. agilis from the larvæ or pupæ of Orthotænia Buoliana, P. hortensis from Tinea lichenella, and a third species, which he names P. terebrator, from the pupæ of Bombyx Salicis; whilst Schönherr has reared P. pedestris from larvæ of Hypera plantaginis, and Degeer has bred a species from the larva of a Curculio. Mr. Haliday bred a species of Pezomachus and Hemiteles fulvipes from the mass of cocoons formed by Microgaster intricatus.

"Scopula prunalis, *W. V.* End of April, the caterpillars feeding on the leaves of scarlet geraniums, at Cranford.

"Lophonotus fasciculellus, *Steph.* The caterpillars feeding on the leaves of Angelica sylvestris, leaving the entire membrane perfect like lace. Several specimens of this beautiful and curious Tinea were bred from them, together with a Microgaster.

"Tephritis guttularis, *Meig.* Bred from galls at the top or collar of roots of Achillea Millefolium.

"Heteroneura albimana, *Meig.* Bred from rotten willows. The pupæ resemble those of Piophila Casei.

"The following Staphylinidæ, which I have not seen in any other British collection, were captured by myself, and have not I believe been recorded as inhabitants of England:—

"Myrmedonia funesta, *Grav.*, I found in a fungus in Birch Wood, on the 6th of May, 1821.

"Gymnusa brevicollis, *Payk.* On the 13th of May, 1844, I swept a fine specimen off rushes by the side of a brook near the sea, at Covehithe, Suffolk; and Mr. Haliday also captured one on the edge of a pond near Holywood, Belfast.

"Euryporus picipes, *Payk.* I took this rare insect in June, 1837: I believe it was found under a stone at Slaughter, in Gloucestershire.

"Stenus vafellus? *Erich.*, and S. æmulus, *Erich.*, I discovered in the marshes at Horning, Norfolk, on the 14th of July, 1840. I am indebted to Mr. Waterhouse for the names of these two species, which he found in my collection."

British Species of Stenus.

Mr. Waterhouse read a memoir, by himself and Mr. Janson, on the British species of the genus Stenus, with notes on the species of the genus in the collection of the late Mr. J. F. Stephens.

Brazilian Ants.

Mr. Smith read a paper, by himself, entitled "Descriptions of some Species of Brazilian Ants, with Observations on their Economy by Mr. H. W. Bates."

In his note on a new species, Eciton legionis, *Smith*, Mr. Bates says that he only found it on open, sandy and grassy *campos*, which kind of locality afforded him an opportunity of observing some parts of the habits of the species, and the business which occupies its immense processions. Among other things, he noticed that the column consisted of two trains of ants, moving in opposite directions, one train empty-handed, the other loaded with a variety of the mangled remains of insects, chiefly the larvæ and pupæ of ants.

Mr. Brayley, present as a visitor, remarked that this fact might illustrate one of the causes of the accumulation of insect remains seen in strata of the secondary geological formation, for if these trains of ants had been covered up suddenly, the stratum in which they were imbedded would in after time exhibit the same appearance as the deposits to which he had alluded.

Mr. Saunders observed, that insects were sometimes congregated together in immense numbers by local or accidental circumstances: he remembered especially that, a few years since, Galeruca Tanaceti was seen in immense numbers on the Norfolk coast.

Errata.

Page 4568, line 12, *for* "cherry-tree drooping" *read* "drooping cherry-tree."
„ 4571, lines 27 and 30, *for* "murinus" *read* "castaneus."
„ „ line 28, *insert a comma after* "Kuper."—*J. W. D.*

Anniversary Meeting, January 22, 1855.—Edward Newman, Esq., President, in the chair.

Election of Officers.

The Secretary read the chapter of the Bye-laws pertaining to the Anniversary Meeting, and the Report of the Library and Cabinet Committee made to and adopted by the Council. The Treasurer's accounts, duly audited, were laid before the Meeting, and it appeared that the finances of the Society were now in a better condition than

at any former period. The ballot for four new members of the Council then took place, when F. Bond, Esq., J. Curtis, Esq., J. Lubbock, Esq., and J. O. Westwood, Esq., were elected in the room of W. S. Dallas, Esq., W. W. Saunders, Esq., S. J. Wilkinson, Esq., and W. Wing, Esq., and the following gentlemen were then elected officers for the year: John Curtis, Esq., F.L.S., &c., President; Samuel Stevens, Esq., F.L.S., Treasurer; J. W. Douglas, Esq., and Edwin Shepherd, Esq., Secretaries.

The President delivered the following Address, for which and his services to the Society during the last two years the Meeting passed a cordial vote of thanks, and requested he would allow the Address to be printed.

Votes of thanks were also passed to Mr. Stevens and Mr. Douglas for their services in the respective offices of Treasurer and Secretary.

THE PRESIDENT'S ADDRESS.

GENTLEMEN,

Time with that rigid punctuality, which disregards alike human haste and human delay, relieves me to-night of those honourable duties with which you have entrusted me; and, permitted by custom, I indulge in a retrospective glance at our progress during the past year.

From the Report of the Library and Cabinet Committee you have learned that our books and collections are in good preservation, but that the exotic insects are in an unsatisfactory state as regards arrangement and naming; an invitation is held out, to such of you as are willing to give your services, to join the Committee and take part in this most desirable labour, and I sincerely hope I shall hear of members voluntarily coming forward and applying themselves to the task: I believe I may even now hint to the Society an offer by Mr. Smith to undertake the arrangement of the Hymenoptera, and we know that there is no member of our Society so capable of accomplishing the task.

I have particularly to congratulate the Society on the state of its finances as disclosed in the Auditor's Report just read: two years ago, owing to unusual and perhaps unavoidable outlay, the Society had incurred a debt which was only liquidated a few days before I came into office by the generous contributions of several of its members, but I am fortunate, peculiarly fortunate, in having presided over the Society for a period of two years during which it has been entirely self-supporting, during which the Chancellor of our Exchequer has drawn from legitimate sources all the funds requisite for the maintenance of our position, and now exhibits a large surplus applicable

to our future requirements. I lay great stress on these facts, because I believe that all societies dependent on accidental, eleemosynary, or any extraneous support whatsoever, contain in themselves the elements of dissolution.

It appears that during the year we have elected ten members and three subscribers, and that we have lost three members by resignation and one by death, and one subscriber by resignation, thus giving us during the year an increase of six members and of two subscribers, a state of affairs on which I think we have every reason to congratulate ourselves: we have also elected, as corresponding members, Mr. Bates and Mr. Wallace, of whose indefatigable industry I said so much on the occasion of my last addressing you, and whose claims on us for the little courtesy thus rendered them will be freely admitted by all of you.

It is my painful duty to say a few words of that member of whom death has deprived us, on the very threshold of what appeared to all a brilliant and a prosperous career.

William Wing in early life was distinguished for his love of Natural History and for the care and accuracy with which he depicted natural objects: in the capacity of an artist he was frequently employed by Dr. Gray, of the British Museum, and the range of objects he delineated was very extensive: by degrees he appears to have turned his attention more and more to Entomology. In 1847 he was elected a member of our Society, and during the last and preceding years he filled the office of one of our Secretaries, but for many months he has been disqualified by illness from attending to the onerous duties which that office entails. He continued to employ his pencil in the cause of Science, and many of the illustrations of the Catalogues of the British Museum, of the Transactions of the Linnean, Zoological, and Entomological Societies, and of several other publications, are the work of his hands: a paper of my own, just published in the Transactions of our Society, owes any value it may possess to the surpassing accuracy with which he depicted the perfect insects, and the artistic skill with which, from very slender materials, he contrived to give most life-like figures of the larvæ. The illustrations of Mr. Stainton's volume on Tineina are also by his pencil, and his last effort was to draw the figures of Goniodoma auroguttella and Nepticula Weaveri for Mr. Stainton's 'Entomologist's Annual.' About twelve months ago a disease that almost always proves fatal exhibited itself, and this, acting on a constitution predisposed to consumption, terminated his life on the 9th of the present month, while in his 28th year. He was distinguished

throughout his brief life by the most amiable and obliging manners, and he will be equally regretted for the amenity of his disposition and his skill as an artist: we have no one who can fill that department in science which his death leaves vacant. Mr. Wing was a Fellow of the Linnean Society, having been elected in 1852. I am only aware of two entomological papers that he has written: these are intituled

Characters of Three New Genera and Species of Lepidoptera. Proc. Zool. Soc. 1854, p. 104.

Descriptions of some Hermaphrodite British Lepidoptera, with figures of the Insects. Trans. Ent. Soc. v. 119.

I must here notice the loss which our Science, although not our Society, has sustained, in four other deaths which have occurred during the year.

Abel Ingpen was born on the 20th of May, 1796: he very early evinced a strong predilection for Entomology, and not only collected with indefatigable industry, but was remarkably careful and neat in his method of nomenclature and arrangement: the success of his labours is proved by the fact that in 1826, or less than twenty-eight years ago, he sold to the Manchester Museum a collection of British insects, of his own making, for the sum of £100: he again made a most valuable collection, not only of insects, but also of shells, fossils, birds' eggs, prints, rare books, &c., all which were arranged and preserved with the utmost neatness and care. He was elected an Associate of the Linnean Society in 1826, and was very regular in his attendance of the meetings of that learned body: he was an original member of the Entomological Society, and for years took an active part in its proceedings, but resigned his membership in 1849. He was also a member of the Microscopical Society, being devotedly fond of the microscope, and having made valuable observations on the structure of the scales on the wings of Lepidoptera. Mr. Ingpen was the author of the little work intituled 'Instructions for Collecting, Rearing and Preserving British and Foreign Insects, and for Collecting and Preserving Crustacea and Shells,' a neat, useful and extremely portable volume, which has gone through two editions, and which ought to be in the hands of every entomologist: to all who have written on "collecting" it forms what might be called the base of operations, and is more practical and more readily understandable than anything in our own language on the same subject. I find one paper by Mr. Ingpen in the Transactions of our Society,* intituled "Remarks on the

* Vol. i. p. 174.

Destruction of Cocci." Mr. Ingpen was also an enthusiast in Horticulture, and contributed many articles to the 'Gardener's Magazine' and 'Horticultural Magazine.' His garden was so well stocked with rarities, and kept in such exquisite order, that the late Mr. Loudon paid it a visit for the express purpose of describing it in the 'Gardener's Magazine.' He died of cholera, at his residence at Chelsea, on the 14th of September, 1854, in the 58th year of his age. He was a man of mild and inoffensive character, and was beloved and respected by all who enjoyed his friendship. By far the greater part of Mr. Ingpen's contributions to science being strictly anonymous, I am unable to give any of their titles, with the exception of those above mentioned.

George Newport, whose name stands first and almost alone as a British physiological entomologist, was born at Canterbury on the 14th of February, 1803, and was apprenticed to his father, a wheelwright, residing in that city. His taste for Natural History was early noticed, and he was appointed to the Curatorship of the Natural History Museum immediately on its establishment: the decided bent of his inclinations, thus evinced, led to a dislike of business and to a preference for the study of medicine; he consequently became a pupil of Mr. Weekes, of Sandwich, and soon afterwards came to London to attend lectures at the London University: here he wrote a paper on the Nervous System of Sphinx Ligustri, and on the changes it undergoes while the insect is progressing to maturity. This essay was read before the Royal Society, and printed in the 'Philosophical Transactions.' No sooner was it known than its merits were admitted, and the author was at once acknowledged to be the most profound physiological entomologist that this country has produced. This remarkable essay is distinguished by the elaborate and conscientious care with which the most minute details are worked out, and it is worthy of record that many of the delicate and difficult dissections were made with the assistance of a single lens. Papers of a similar character rapidly succeeded each other, and occupied him almost up to the hour of his death: of these I can only give the titles; a volume might be occupied in critically analyzing the works themselves. He was elected a member of the Entomological Society in 1835, and filled the President's chair in 1843 and 1844, but resigned his membership in 1848: he was also a Fellow of the Royal and Linnean Societies. While engaged in his researches on the changes which the ovum of the frog undergoes during its development, it became necessary to examine the living objects in all their stages; and in his zeal to procure these, during the chilly

months of February and March, he is supposed to have contracted that fever which terminated his life: he died at his residence in Cambridge Street, Hyde Park, on the 6th of April, 1854. I cannot conclude this notice more appropriately than in the words of Mr. Bell:—"He loved and followed Science for her own sake; and if occasionally he appeared somewhat tenacious of his opinions and over-anxious for his own fame, surely this was pardonable in one who gave up all for the pursuit of knowledge, depriving himself without a murmur of even the most common comforts, that he might devote himself the more unreservedly to the one noble object of his life. He worked for knowledge and perhaps for fame; but he never prostituted science to gain, nor mingled ignoble motives with his pursuits."

List of Mr. Newport's Scientific Papers.

On the Nervous System of the Sphinx Ligustri, and the changes which it undergoes during a part of the Metamorphoses of the Insect. Phil. Trans. cxxii. 383, and cxxiv. 389.

On the Respiration of Insects. Id. cxxvi. 529.

On the Temperature of Insects, and its connexion with the Functions of Respiration and Circulation in this Class of Invertebrated Animals. Id. cxxvii. 259.

On the Organs of Reproduction and the Development of the Myriapoda (1st Series). Id. cxxxi. 99.

On the Structure, Relations and Development of the Nervous and Circulatory Systems, and on the Existence of a complete Circulation of the Blood in Vessels in Myriapoda and Macrourous Crustacea. Id. cxxxiii. 243.

On the Reproduction of Lost Parts in Myriapoda and Insecta. Id. cxxxiv. 283.

On the Impregnation of the Ovum in Amphibia. Proc. Roy. Soc. v. 971; vi. 82, 171.

On the Respiratory Organs of the Common Leach (*Hirudo officinalis*) and their connexion with the Circulatory System. Id. iii. 206.

Monograph of the Class Myriapoda, Order Chilopoda, with Observations on the General Arrangement of the Articulata. Linn. Trans. xix. 265 and 349.

On the Aqueous Vapour expelled from Bee-hives. Id. xx. 277.

Note on the Generation of Aphides. Id. xx. 281.

On the Natural History, Anatomy and Development of the Oil-beetle (*Meloë*), more especially of Meloë cicatricosus of Leach.—First Memoir: The Natural History of Meloë. Id. xx. 297.—Second Memoir: The History and General Anatomy of Meloë, and its Affinities, compared with those of Strepsiptera and Anoplura, with reference to the connexion which exists between Structure, Function and Instinct. Id. xx. 321.—Third Memoir: The External Anatomy of Meloë in its relation to the Laws of Development. Id. xxi. 167.

On Cryptophagus cellaris of Paykull. Id. xx. 351.

On the Formation of the Air-sacs and dilated Tracheæ in Insects. Id. xx. 419.

On the Anatomy and Affinities of Pteronarcys regalis of Newman, with a Postscript containing Descriptions of some American Perlidæ, together with Notes on their Habits. Id. xx. 425.

The Anatomy and Development of certain Chalcididæ and Ichneumonidæ, compared with their Special Economy and Instincts; with Descriptions of a New Genus and Species of Bee-Parasites. Id. xxi. 61 and 85.

Further Observations on the Genus Anthophorabia. Id. xxi. 79.

Further Observations on the Habits of Monodontomerus; with some Account of a New Acarus (*Heteropus ventricosus*), a Parasite in the Nests of Anthophora retusa. Id. xxi. 95.

On the Ocelli in the Genus Anthophorabia. Id. xxi. 161.

On the Predaceous Habits of the Common Wasp (*Vespa vulgaris*, L.) Ent. Trans. i. 228.

On the Use of the Antennæ in Insects. Id. ii. 229.

On the Habits and Structure of the Nests of Gregarious Hymenoptera, particularly those of the Hive-Bee and Hornet. Id. iii. 183.

On the Habits of Megachile centuncularis. Id. iv. 1.

On the means by which the Honey-Bee finds its way back to the Hive. Id. iv. 57.

Address to the Entomological Society at the Anniversary Meeting, 1844. Id. 1845.

On Iulus Sandvicensis et I. pilosus. Proc. Ent. Soc. Lond. 1842.

On the Parasitic Habits of Nomadæ. Id. 1842.

On some New Genera of the Class Myriapoda. Proc. Zool. Soc. x. 177.

On the Anatomy of certain Structures in Myriapoda and Arachnida which have been thought to belong to the Nervous System. Lond. Med. Gaz. 1838, p. 970.

A List of the Species of Myriapoda Chilopoda contained in the Cabinets of the British Museum, with Synoptic Descriptions of 47 New Species. Ann. & Mag. Nat. Hist. xiii. 94 and 263.

On the Genus Atya of Leach, with Descriptions of four apparently New Species. Id. xix. 158.

The Article "Insecta" in Todd's 'Cyclopædia of Anatomy and Physiology,' iv. 853—994.

Observations on the Anatomy, Habits and Economy of Athalia centifoliæ, the Saw-fly of the Turnip, and on the means which have been adopted for the prevention of its Ravages; being a Prize Essay proposed by the Entomological Society of London in conjunction with the Agricultural Society of Saffron Walden.

Major Champion recently died at Scutari of wounds received in the Crimea: twenty years ago he was well known to the readers of the 'Entomological Magazine,' under the pseudonym of "Ionicus," by his admirable papers on the economy of certain Cephalonian insects, published in the third volume of that Journal: it is true that some of the statements there published related to facts previously familiar to entomologists, yet described with great care and evident originality; others, for instance the fact that Brachinus græcus explodes with its mouth, I have not seen elsewhere. "On the approach of danger," wrote the author, "this insect salivates and a bubble appears at its mouth; on contact with the air it explodes with a considerable report, and gaseous matter may be seen rising up like smoke: * * * on being immersed in boiling water to kill it, it let off one of these

explosions, and the water for about an inch around it effervesced much in the same manner as a Seidlitz powder." Major Champion collected botanical as well as entomological specimens, not only in Greece, but also in China and Ceylon. In the second volume of the new series of our 'Transactions,' he is spoken of by Mr. Bowring as "a very zealous entomologist:" he discovered many new Coleoptera, some of which are described by Mr. Westwood in our 'Transactions,' and one is named after him Callirhipis Championii. Major Champion's scientific papers are as follow:—

Notes on Various Insects. By Ionicus. Ent. Mag. iii. 176, Id. 376, and Id. 460.

A foreign entomologist, Count Mannerheim, well known as an acute and diligent Coleopterist, and the author of a great number of Memoirs, most of them descriptive, published in the 'Bulletin de la Société Impériale des Naturalistes de Moscou,' died at Stockholm, on the 9th of October, 1854.

The interest as well as the attendance of our meetings has been well maintained, and many of the exhibitions and notices have led to animated discussions. Three subjects appear to be peculiarly worthy of remark: 1st, the production of silk by other insects than the well-known and invaluable Bombyx Mori; 2nd, the materials of which wasps construct their nests; and 3rdly, the communication of motion to seeds by the movements of an inclosed insect. With your permission I will say a few words on each of these.

One of the silk insects, and that which has obtained the most attention, is the Bombyx Cynthia, a native of Assam, the larvæ of which feed on the castor-oil plant (*Ricinus Palma-Christi*): it was first introduced to our notice by Mr. Spence, who read some extracts from the 'Journal of the Society of Arts,' from which it appeared that this insect was reared most extensively over a large part of Hindustan, more particularly in the districts of Dinagpur and Rangpur,—that the silk was of incredible durability, and the insect so prolific that twelve broods were reared in one year. Dr. Helfer, who transmitted the information, adds, that he estimates that no less than 150 of the Indian Bombyces form cocoons more or less adapted for manufactures. At the June meeting Mr. Westwood exhibited some of the cocoons of this insect, forwarded from Malta by Dr. Templeton, together with an inquiry whether any method was known by which the silk could be unwound; and finally, at the October meeting, our Secretary read extracts from the 'Journal of the Society of Arts,' showing that the insect had been introduced with complete success into Malta and

Italy; and Mr. Westwood added that Professor Solly had made several experiments on the cocoons brought to England, and he believed a method of unwinding the silk from the cocoons had been discovered. At Vienna a number of experiments have been made with a view to introduce the silk of Saturnia pavonia-media as an article of commerce: the few particulars yet known were introduced to your notice by myself at a late meeting of the Society. From the information I have received on this subject it seems highly probable that these experiments will lead to the most important results, since the insect not only produces the raw material, but completes the fabric without the intervention of machinery. Nevertheless on these important topics a few commercial questions necessarily obtrude themselves: for instance, is there any difficulty in obtaining an ample supply of silk from the well-known silkworm? will the new species, or either of them, bear a greater degree of cold than the silkworm of China? can the silk be produced cheaper? is it more durable—of finer quality or colour? The man of science will be interested in all such discoveries as those to which I have alluded, but before we can engage the merchant in the cause we must point out to him its pecuniary advantages.

The materials used by wasps for the paper-like substance of which their nests are composed was brought under consideration, by the late Mr. Ingpen, at the July and August meetings: having detected fungoid matter in the nest of an exotic wasp, he thought it probable that those of our native species were not altogether composed of wood, as is generally believed; and, in corroboration of this idea, that lamented entomologist exhibited a piece of decayed wood from one of the cedars in the Botanic Garden at Chelsea, in which was a layer of fungus, and wasps were observed to frequent this, apparently for the purpose of obtaining building materials: in support of such a supposition I took occasion to observe to you that a mass of anomalous matter, cut from a wooden rail, had been found, on a microscopic examination, to be entirely fungoid. In connexion with this subject were two other statements of much interest: the first from the late lamented Mr. Wing, that he had seen wasps collecting the tomentum of a mullein; the other from Mr. Watkeys, that he had seen wasps at work on the stems of dead and dried nettles. I observed that all other speakers on the subject strove to establish the fact that wasps had been seen in the act of detriting the surface of palings, &c., a fact that I previously conceived to be so notorious as not to need this reiteration. Reverting, then, to the question raised by Mr. Ingpen, "What is the material actually used by wasps?" I am able with confidence to announce the

following results:—The nest of Vespa Norvegica is not uniform in its composition: in one part it consists of very long, flat, cotton-like fibres, very much resembling, if not actually identical with, the long silky hairs attached to the seed of the cotton-grass (*Eriophorum*), intermixed with a very few fibres of woody tissue, and in a number of examinations a single fibre only was detected of coniferous wood: in another part of the same nest the cottony fibres of the supposed Eriophorum were intermixed with particles of the cuticle and large cellular tissue of what appears to be a species of Juncus. The nest of Vespa germanica is almost entirely composed of loose bundles of flexible cotton-like fibre, the material and structure being very similar to that in the nest of Norvegica, but other fibres are intermixed, precisely similar to those which compose the epidermis in the thistle tribe. The disposition of the fibres is similar in the material used by both these species: they look as if felted together. The exterior of the nest of Vespa vulgaris is composed of the vascular tissue of coniferous and other woods: spiral cribriform and entire vessels occur in abundance, with fragments of divergent layers frequently adhering to them; the entire substance is composed of these materials, with a considerable admixture of transparent cementing matter having just the appearance of irregular films of isinglass: the interior of the nest is composed of the same materials more highly comminuted, and with a larger admixture of the cementing matter. When I tell you that the nests and names were obligingly supplied by Mr. Smith, and that the microscopic investigation was conducted by Mr. Bowerbank, unrivalled in his knowledge of intimate structure, you will see that the *facts* elicited must be received as final: the *conclusions* drawn from them may be various; my own conviction is that each species, or perhaps even each colony, may select the most accessible substance suited to its purpose: thus the wasp of the barren moor may find suitable material at hand in the gracefully flowing tresses of the cotton-grass, while our London wasp may obtain from every post and rail all that is required: again, the exotic species instanced by Mr. Ingpen may have built its dwelling in a region of Fungi, and have found in the dried fibres of these generally fugitive vegetables a fitting material for its purpose: again, the nest of the tree wasps, exposed to wind and rain, may need a different material from that used by the ground wasp, whose nest is always sheltered from the storm. Simple, and I trust satisfactory, as this explanation may appear, it is one which must fill our minds with the most profound admiration; for it exhibits a being which we heretofore supposed to be acting under the influence

of a blind but unerring instinct, like a machine or automaton worked by steam or by clock-work; it exhibits that being in a new and unlooked-for character,—the character of a calmly reasoning architect, who, in the first instance, selects his materials according to the site of his building, and who, secondly, not finding at hand the material best suited to his purpose, substitutes another totally and widely different as far as all external appearances are concerned, still perfectly adapted to his requirings. It is held to be a triumph of intellect when a man thus substitutes one article for another and incurs no loss by the change, but here we have a much-despised insect constantly doing this, always reasoning on, and shaping its course by adventitious circumstances. Is it not a fresh proof of the perfect wisdom of that Power which has created and which upholds the Universe!

The third subject, which has attracted attention at some of our meetings, I am compelled to strip of its miraculous character: I allude to the so-called "jumping" of seeds. The seeds to which our friend Mr. Westwood alluded, in the interesting communication made at the meeting of October 2nd, were the cocci or compartments of the well-known tricoccous fruit of a Euphorbiaceous plant, the botanical name of which, if indeed such name exist, is not ascertained; but the general character of such vegetable productions is familiar to many of you: they may be said to possess three surfaces; one highly convex, almost hemispherical; the two others flatter, but still slightly convex: in the species under consideration these cocci were about a third of an inch in length, and each of them contained an obese maggot, believed by Mr. Westwood and Mr. Stainton to be Lepidopterous, a conclusion which I am quite willing to believe correct, since I have long since observed the Coleopterous larvæ confine their ravages to farinaceous seeds, while Lepidopterous larvæ are not unfrequently found devouring the interior of oleaginous seeds, of which fact I might cite many apposite examples: this larva is contained within the coccus. Many of the cocci moved from the first; others were quiescent at first, and could only be induced to move by the application of warmth; many did not move at all: the motion was slight and of a rocking character, such as a man in a cask, a child in a cradle, or people in a boat, would produce; and which, repeated, sometimes amounted to a slow progressive movement, so that in some instances the cocci were eventually worked off the table by the movements of the contained larvæ: the motion was of course more observable when the coccus rested on its more convex than on its less convex surface; but it did not even then entirely cease. Dr. Hooker, who has most

obligingly supplied me with this information, adds, "Many people saw this motion day after day; we had them exhibited at parties, and I think if you reflect you will agree with me that it is nothing more than a repetition of the old trick of the mouse in the egg, and"—here, gentlemen, I wish you to notice particularly Dr. Hooker's concluding words—"besides this rocking I never saw any other motion whatever." The accounts previously published in Réaumur and Kirby and Spence, of cocoons or pupæ possessing locomotive powers, and to which allusion was made at two successive meetings, do not appear to meet the case: they belong to quite another class of phenomena, and must still rest on their respective authorities, which I do not for a moment question, but which are totally independent of and totally unsupported by these more recent observations.

The year has been remarkable not only for the number but for the extent and the intrinsic value of its entomological publications. Of our own 'Transactions,'* of which four unusually valuable parts have been published, I refrain from saying anything, since every member must be thoroughly acquainted with them: of the other serials I say but a few words.

In the 'Annals and Magazine of Natural History'† for August is a description by Mr. Wollaston of an entirely new curculionideous insect, which that gentleman has called Pentarthrum Huttoni: it is one of the Cossonides of Schönherr, yet is so singularly constructed as respects the funiculus of the antennæ, which is five-jointed, that it may be regarded as connecting the Cossonides with the Rhyncophorides, in which a similar number of joints occasionally obtains: four specimens of this curious insect were extracted from the hard and undecayed wood of a cherry tree at Alphington, near Exeter, in November, 1853.

Mr. Stainton has commenced, in the 'Zoologist,'‡ an essay on Ento-

* 'Transactions of the Entomological Society of London.' New Series. Vol. ii. Part 7. 1854. Price 3*s.* 6*d.*
Id. 1854. Vol. ii. Part 8. Price 4*s.*
Id. 1854. Vol. iii. Part 1. Price 3*s.* 6*d.*
Id. 1854. Vol. iii. Part 2. Price 3*s.* 6*d.*

† 'The Annals and Magazine of Natural History.' London: Taylor & Francis. 1854. Nos. 73—84. 2*s.* 6*d.* each.

‡ 'The Zoologist: a Popular Monthly Magazine of Natural History, and Journal for recording Facts and Anecdotes relating to Quadrupeds, Birds, Reptiles, Fishes, Annelides, Insects, Worms, Zoophytes, their Habits, Food, Retreats, Occasional Appearance, Migrations, Nests and Young.' London: Van Voorst. 1854. Nos. 135—146. Price 1*s.* each.

mological Botany, more especially with reference to the plants frequented by the Tineina. This work promises to be very useful: it is on the plan of Martyn's 'Aurelian's Vade-Mecum,'* published at Exeter in 1785, and a work which the late Mr. Stephens highly prized: it is an almost forgotten but invaluable witness to "the light of other days." Mr. Harding, the President of the Society of British Entomologists, has taken up the same subject, and has made various observations on the pupa-cases and food-plants of Micro-Lepidoptera: these will be found in various numbers of the 'Zoologist.'

In the January number of the 'Zoologist' I had the pleasure of recording the capture of Zygæna Minos in Ireland, by Mr. Milner, of Nunappleton, and in the September number are some valuable remarks on this interesting insect by Mr. A. G. More, who informs us that it occurs all around Castle Taylor, Ardrahan, and that he has traced it within the limits of the county Galway as far as Garryland: it is more particularly abundant towards the sea: it appears about the first week in June, and is in perfection until the middle of the month; it then swarms on many parts of the rock-strewn pasture so characteristic of the mountain limestone district of the West of Ireland.

In the December number of the 'Zoologist' is a minute description, by that indefatigable collector Mr. Bold, of a brachelytrous insect, which he has called Lathrobium carinatum: the very careful description has enabled our excellent curator, with little hesitation, to identify the species with the Lathrobium dentatum of Kellner, described at page 414 of the 'Entomologische Zeitung' for 1844; but even under the altered name the insect is new to this country, and an interesting addition to our insect Fauna: two specimens only have come under Mr. Bold's notice; one, a male, taken by himself under gravel by the river Irthing, in Cumberland; the other, a female, in a similar locality, on the Devil's Water, Northumberland, by Mr. Wailes.

In the same number of the 'Zoologist' is a notice of the occurrence of Dytiscus lapponicus in the Isle of Mull, together with a copy of Gyllenhall's description. The Rev. Hamlet Clark, who made this interesting discovery, says that he took four specimens on four different occasions, in a very deep lake in the Isle of Mull, in September, 1854. Mr. H. Clark expresses his belief that the Dytiscus septentrionis, distinguished by the smooth elytra of the female, will be

* 'The Aurelian's Vade-Mecum; containing an English Alphabetical and Linnean Systematical Catalogue of Plants affording nourishment to Butterflies, &c.' By M. Martyn. Exeter: 1785. 8vo.

eventually referred to lapponicus: it seems to be now pretty clearly established that the smoothness or sulcation of the elytra in Dytisci is neither a certain character of species nor absolutely diagnostic of sex.

A great number of other notices occur in the 'Zoologist,' recording the capture of novelties or rarities, but I will not repeat them here, because that Journal is always on your table as soon as published; and, moreover, I believe I may congratulate myself on having each individual member as a subscriber.

In the 'Transactions of the Linnean Society'* are two beautifully illustrated papers by that distinguished entomologist whom, since I began to address you, you have elected as your future President. The first of these is intituled "On the Genus Myrmica and other indigenous Ants;" the second, "Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera." In the paper on British Ants Mr. Curtis enumerates five genera and sixteen species, two of which, Myrmica perelegans and M. denticornis, are presumed to be new to science. The paper on Hypocephalus has a double object; the first, used as a stepping-stone to the second, is to show that Hypocephalus belongs to the great Coleopterous section of Lamellicorns; the second, in the author's own words, is "to assist in fixing our systems on some firm basis, generally understood and universally to be adopted, so that we may no longer be tossed to and fro as we are at present." I am sure that every entomologist will give his meed of praise to so high an object as these words disclose, but I do not feel quite so confident that what I have called the stepping-stone to this philosophical eminence will be so generally availed of: I do not feel quite sure that entomologists will, with the same unanimity, agree to place Hypocephalus among the Lamellicorns, and I should scarcely be enacting my present part with perfect faithfulness were I not to say that I entertain a different view; but it must be distinctly understood that I dissent simply in my individual capacity as an entomologist, entirely disclaiming any importance for my dissent on account of the office which I have just relinquished; and I feel confident that Mr. Curtis will at once pardon what is simply an avowal of difference of opinion.

Mr. Stainton has published the first number of a new serial called the

* 'Transactions of the Linnean Society.' Vol. xxi. Part 3. 4to. Plates. London: Longman. 1854. Price 12*s*.

'Entomologist's Annual:'* it contains much useful information, collecting in a concise manner the published records of novelties added to our lists of Lepidoptera, Hymenoptera and Coleoptera: these three orders are worked out respectively by Mr. Stainton, Mr. Smith and Mr. Janson. Mr. Stainton has likewise issued a second edition of the 'Entomologist's Companion,'† and has completed the Museum Catalogue of the British Lepidoptera‡ interrupted by the death of the lamented James Francis Stephens.

Mr. Walker, with a laborious assiduity which I have never known surpassed, has produced four Parts of the Museum Catalogue.§ Some idea of these important works may be gained by the following summary. The first list is intended to include short descriptions of all the species, genera and families of Lepidoptera: the first part contains descriptions of 508 species, of which 114 are Cydimonii and 394 Zygænides; in the Cydimonii there are 21 new species, and in the Zygænides 175: the second part contains descriptions of 575 species of Lithosiidæ, of which 276 are new: the total number of species is 1083, of which 472 are new. The second list includes descriptions of the species of Diptera not characterized in the first series of the same work or in the 'Insecta Saundersiana:' the first part contains 379 species of Stratiomydæ, of which 26 are new; 36 of Xylophagidæ, of which 1 is new; and 830 of Tabanidæ, of which 31 are new: the second part contains 74 species of Acroceridæ, and 470 of Asilidæ, of which 8 are new: the total number of species is 1789, of which 66 are new.

Mr. Andrew Murray, of Conland, has published an admirable

* 'The Entomologist's Annual for 1855, comprising Notices of the New British Insects detected in 1854.' Lepidoptera, by the Editor, H. T. Stainton: Hymenoptera, by Frederick Smith: Coleoptera, by E. W. Janson. Col. Plates. London: Van Voorst. 1855. Price 2*s.* 6*d.*

† 'The Entomologist's Companion.' Second Edition. By H. T. Stainton. London: Van Voorst. 1854. Price 3*s.*

‡ 'List of the Specimens of British Animals in the Collection of the British Museum.' Part 16. Lepidoptera completed. London: 1854. Price 3*s.*

§ 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum.' Part 1. Lepidoptera: Heterocera. London: 1854. Price 4*s.*

Id. Part 2. Lepidoptera: Heterocera—continued. 1854. Price 3*s.* 6*d.*

'List of the Specimens of Dipterous Insects in the Collection of the British Museum.' Part 5, Supplement 1. London: 1855. Price 4*s.* 6*d.*

Id. Part 5, Supplement 2. 1855. Price 3*s.*

'Catalogue of the Coleoptera of Scotland:'* this little work not only equals but far surpasses any Catalogue of Coleoptera ever published in England: it exhibits an acquaintance with the best continental authorities and great power in adjudicating the true value to supposed species. It is a source of the most unmixed pleasure to me to see Scotland, the finest field for the naturalist in the Queen's dominions, thus understood, appreciated and illustrated by one of her own sons.

Our indefatigable friend Mr. Westwood has just published a reissue of his work on the Butterflies of Britain,† and also a Supplement to Wood's 'Index Entomologicus,'‡ which "contains five plates now first engraved, exhibiting 180 coloured figures of British moths and butterflies not included in the former edition of the 'Index Entomologicus,' with synonyms and localities, also a systematic list of the whole of the species, in order to show their distribution into families and the position of the supplemental species, and of those whose generic classification has been modified."

Messrs. Baikie, Barron and Adams have published a work intituled 'A Manual of Natural History for the Use of Travellers.'§ This volume contains 750 pages, 150 of which are occupied by Entomology.

I now arrive at the Rev. J. F. Dawson's Monograph of the Carnivorous Ground-beetles,‖ a work that bears internal evidence of invincible assiduity and a profound knowledge of the subject. This volume is less remarkable for the amount of new matter it contains than for the mass of old and worthless matter which it sweeps away. Nothing was ever more extraordinary than the wholesale destruction of names which Mr. Dawson has achieved. Those entomologists who had

* 'Catalogue of the Coleoptera of Scotland.' By Andrew Murray, of Conland, W. S. Blackwood: Edinburgh and London. 1853.

† 'The Butterflies of Great Britain, with their Transformations delineated and described.' By J. O. Westwood, Esq., F.L.S., &c. Col. Plates. London: Orr. 1855. Price 15*s*.

‡ 'A New Supplement to Wood's Index Entomologicus, or a complete Illustrated Catalogue of the Lepidopterous Insects of Great Britain.' By J. O. Westwood, Esq., F.L.S., late President of the Entomological Society, &c. Col. Plates. London: Willis. 1854. Price 12*s*. 6*d*.

§ 'A Manual of Natural History for the Use of Travellers, being a Description of the Families of the Animal and Vegetable Kingdom.' By Arthur Adams, William Balfour Baikie and Charles Barron. London: Van Voorst. 1854. Price 12*s*.

‖ 'Geodephaga Britannica. A Monograph of the Carnivorous Ground-beetles indigenous to the British Isles.' By John Frederic Dawson, LL.B. Col. Plates. London: Van Voorst. 1854. Price 12*s*.

reserved long gaps in their cabinets, under the fond idea that these were to be eventually filled, now find that half the names for which this extensive accommodation was prepared actually signify nothing, while a large portion of the remaining moiety is comprised of names erroneously applied. I do not lay this enormous mass of error at the doors of any one or two or three individuals who may have been more actively engaged than the rest in literary labours in Entomology: we have all more or less contributed to this confusion by fostering a morbid desire for novelty, and a consequent tendency to exalt unreasonably the importance of accidental and inconstant differences. The numerical diminution of names in Mr. Dawson's work extends to the genera as well as to species, and no less than 31 genera, which had become familiar as household words, have merged in others and disappear: these are — Lamprias merged in Lebia; Helobia and Pelophila in Nebria: Blethisa in Elaphrus; Trimorphus in Badister; Platynus and Agonum in Anchomenus; Pœcilus, Abax, Platysma, Adelosia, Steropus, Omaseus, Argutor and Platyderus in Pterostichus; Celia, Acrodon, Percosia, Bradytus and Curtonotus in Amara; Ophonus in Harpalus; Epaphius in Trechus; Cillenum, Tachys, Ocys, Philocthus, Peryphus, Notaphus, Leja, Lopha and Tachypus in Bembidium. These are sweeping alterations, but I think there is no doubt they will be regarded as wholesome ones, for this department of our science had really become overloaded with names that signify nothing. The actual additions to our British Geodephaga make slight compensation for the large deductions: these are twenty-one in number, and are highly interesting in character:—1. Dyschirius obscurus of Gyllenhall, found by Mr. Haliday on the sandy shores of Lough Neagh. 2. Dyschirius impunctipennis of Dawson, found by the author by the side of a stream on the Smallmouth sands, near Weymouth. 3. Dyschirius jejunus of Dawson, found by Mr. Bold, of Newcastle, on a sandy bank of the river Irthing, in Cumberland, a little above Lanercost Abbey. 4. Anchomenus atratus of Duftschmidt, first captured in Hampshire, afterwards in Cornwall and other western counties of England, and very abundantly near Bristol. 5. Amara curta of Dejean, not uncommon on the sand-hills at Deal, in company with lucida and tibialis, but readily distinguishable from either by its broader form. 6. Amara ingenua of Duftschmidt, a well-known European species, but unique as British, the only known example having been captured in Scotland. 7. Harpalus cordatus of Duftschmidt, also well known on the Continent and also unique as British; the only example was captured by the author near Deal, at the roots of

tall wing-grass which grows on the sand-hills. 8. Harpalus rupicola of Sturm, found in chalky districts, Dorking, Basingstoke and the Isle of Wight. 9. Harpalus sulphuripes of Germar; a single example taken near Bristol. 10. Harpalus Wollastoni, of which four or five specimens were captured by Mr. Wollaston, in May, 1852, at Slapton Ley, Devonshire. 11. Harpalus melancholicus of Dejean, captured by Mr. Wollaston near Swansea. 12. Stenolophus elegans of Dejean, found by the Rev. Hamlet Clark between Sheerness and Queensborough, in the Isle of Sheppey. 13. Stenolophus derelictus of Dawson, found near London by Mr. F. Smith. 14. Stenolophus exiguus of Dejean, discovered in England by Mr. Samuel Stevens, who captured a few specimens on Bury Hill, near Arundel: a single specimen was taken by Mr. Wollaston in the Isle of Wight, and Mr. Dawson himself subsequently took a series of the insect on the sands at Pegwell Bay, near Ramsgate, in February, 1849. 15. Bradycellus cognatus of Gyllenhall, a mountain species, which appears to occur only on the high moors of Wales, Yorkshire and Scotland. 16. Bembidium fluviatile of Dejean, taken by Mr. Hadfield, of Newark, on the banks of the Trent at Kelham. 17. Bembidium stomoides of Dejean, captured by Mr. Bold, of Newcastle, on a sandy bank by the Irthing. 18. Bembidium obliquum of Sturm, found also by Mr. Bold, at Gosforth, in Cumberland. 19. Bembidium Schuppelii of Dejean, found by Messrs. Bold, Murray and Wailes, on the banks of the Irthing. 20. Bembidium Doris of Panzer, an insect of rare occurrence in the salt-marshes of England. And lastly—21. Bembidium callosum of Kuster, found by Mr. Steuart on Woking Common. I believe the whole of these twenty-one insects to be perfectly distinct as species, certainly all of them are new as British. It would have been a labour of love with me to have abridged the minutely accurate characters which Mr. Dawson has drawn up for each of them, but I think that every British Coleopterist is bound to possess himself of this valuable volume.

In next calling your attention to Mr. Stainton's work on the British Tineadæ,* it seems necessary to glance at the previous closet-history of these minims of their tribe: this closet-history commences in 1829 with the publication of the fourth Part of Haworth's 'Lepidoptera Britannica,' a monograph the most complete, the most learned, the most useful, ever published on the Entomology of Britain, and

* 'Insecta Britannica.' Lepidoptera: Tineina. By H. T. Stainton. 8vo. Plates. London: Lovell Reeve. 1854. Price 25*s*.

one which will long remain an invaluable treasure to the Lepidopterist. The sterling good qualities of Haworth are, first, that he described from Nature, and, secondly, that he described well: he says, "My specific and detailed descriptions of every species and variety are entirely new-wrought, and from British specimens, except in a few instances, where I either had no British specimen, or where they were not very good, in which cases only I have extracted the description of Linneus, Fabricius or Villars, and in no instance without a proper acknowledgment." That Haworth, working almost alone, should have fallen into some errors is not only excusable, but must be regarded as a necessary consequence of this comparative isolation: thus it need not be concealed that in several instances he multiplied species unnecessarily, while in others he reduced Nature's species to the rank of varieties; but these last he distinguished by the significant memorandum "Fortè propria species." Of the Tineadæ, the family to which my observations are now exclusively directed, Haworth described 286, and from that period the study of the Micro-Lepidoptera appears to have received an impetus which culminated in the appearance of Mr. Stainton's volume: the great labourers in this fruitful vineyard to whose names I would particularly call your attention are Mr. Stone, Mr. Bentley, Mr. Chant, Mr. Stephens, Mr. Edwin Shepherd, Mr. Bedell, Mr. Douglas, Mr. Samuel Stevens, Mr. Doubleday and Mr. Weir; and more recently Mr. Wing, Mr. Allis, Mr. Wilkinson, Mr. Boyd, and many others, have laboured assiduously in the field: the collections of Stone, Bentley and Shepherd have stood out conspicuously and prominently from the rest: that of Stone was, for its day, incomparably the finest, but merged in that of Bentley, and eventually in that of Shepherd, which I presume now stands as a whole entirely without a rival, although perhaps equalled or surpassed in all groups except the Tineadæ by that of my worthy friend Doubleday: still, although the labourers have been so many and so successful, two of them appear to me to call for individual notice, and these are the late James Francis Stephens and William Bentley, both of them distinguished for the extreme liberality, candour and pains-taking with which they opened their collections, compared specimens, explained differences, and unlocked and made patent without reserve the arcana of the science; and to the memory of Mr. Stephens a still greater debt of gratitude is due, for the free use he allowed all students to make of his magnificent library of entomological works. Mr. Stainton is now in the possession of this library, and, with such an accession to his own previously extensive collection of authors on Lepidoptera,

possessed of an energy which no obstacle can resist, an assiduity which no amount of labour can weary, and turning his attention almost exclusively to these minims, it is not extraordinary that he should have produced, as he has done, a second most useful monograph on a subject already ably treated. It contains really elaborate descriptions of 591 species, of which 272 are not given as species by any other British author. I say advisedly "as species," because I am well aware that "as varieties" some few of them are noticed by the illustrious Haworth, in whose footsteps Mr. Stainton has closely followed, by carefully describing every species, as he himself assures us, from actual specimens. It would far exceed the limits, and indeed the object, of an evanescent summary like this, were I to give even the names, authorities and localities of the new species, as I have done in the instance of Mr. Dawson's Geodephaga: the most superficial mention of 272 species would occupy an hour at least, and I will not venture such a tax on your patience. All that I can do is cordially to recommend Mr. Stainton's volume, and to hope that all may profit by it equally with myself. The copious and almost crowded illustrations by the pencil of our deeply-lamented assistant-secretary are worthy of attentive study.

But the most important and valuable work I have to notice, and the one which as a work of science will confer most honour on this country, is the 'Insecta Maderensia' of Mr. Wollaston.* This work is distinguished throughout by persevering industry, profound knowledge and philosophical spirit. Nothing can exceed the industry with which the author has pursued his object, a fact that will be sufficiently evident when I state that he has described 213 genera and 482 species of Madeiran Coleoptera, out of which 41 of the genera and 270 of the species are now characterised for the first time, and are therefore absolutely new to science. With regard to the solid entomological knowledge possessed, and in every page made manifest without display, there can be but one opinion, for not a single species or genus is mentioned unaccompanied by the evidence of a perfect knowledge of its antecedent history: this, I am aware, is very high praise, but it is praise which no one can say is unmerited. The philosophical spirit is manifested equally in the masterly characters given of every genus and species, and in the explanatory remarks which invariably follow

* 'Insecta Maderensia; being an Account of the Insects of the Islands of the Madeiran Group.' By T. Vernon Wollaston, M.A., F.L.S. 4to. Col. Plates. London: Van Voorst. 1854. Price £2 2*s*.

each description; and I must not omit to add that these descriptions and remarks are invaluable to the British Coleopterist, because a large proportion of the genera described and cited for comparison are familiar to us as indigenous to Britain. Into such descriptions and such remarks it is impossible for me to enter here, but I cannot forego the opportunity of citing some general observations which appear to me of more than ordinary value. The statistical conclusions forced on Mr. Wollaston's attention by his analysis of the Madeiran Coleoptera are as interesting as unaccountable. In this mild and sunny isle there is not a single representative of those lovers of warmth and sun, the Cicindelidæ and Buprestidæ; in the deep mossy ravines there is no representative of the moss-loving Pselaphidæ; in this land of flowers the flower-feeding lamellicorns and the Elateridæ have each but a single and abnormal representative: descending to genera, the cosmopolitan Carabus, Nebria, Silpha, Necrophorus, Cetonia, Telephorus, Tentyria, Pimelia, Acis, Asida and Otiorynchus are entirely unrepresented. The numerical proportion of the thirteen great groups of Coleoptera present in Madeira is as follows:—

Rhyncophora	104
Necrophaga	80
Brachelytra	74
Geodephaga	63
Serricornes	35
Atrachelia	29
Cordylocerata	22
Phytophyga	21
Pseudotrimera	17
Philhydrida	13
Trachelia	11
Hydradephaga	7
Longicorns	6
	482

The most remarkable feature in this list is not the preponderance of Curculionidæ, Necrophaga, Staphylinidæ and Carabidæ, all of which one would suppose abundant, but the extremely small number of water-beetles and longicorns: 4 Colymbetes, 2 Hydropori, and the familiar Gyrinus natator, are all the Hydradephaga. Mr. Wollaston thinks that this paucity 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 rocks," being peculiarly unfavorable to the preservation of insect life: this is a reasonable solution, but how shall we account for the absence of Cerambycidæ from this island of woods? and how shall we account for the great scarcity of all flower-loving Coleoptera, except on the supposition that their office of pollen-bearers is performed by the hosts of Hymenoptera and Diptera. Mr. Wollaston's remarks on the effects of isolation on species are worthy of deep study and attention; they will be found appended to the descriptions of Scarites abbreviatus, Calathus complanatus, Harpalus vividus, and the Ptini: after alluding to the two sections of the latter, the author proceeds to say that "the representatives of both are subject to very great variation in size and colour, and, since even the sexes themselves often display considerable incongruity, *inter se*, it is not surprising that the boundaries between some of the species which are nearly allied should be difficult to trace out. Such being the fact, it is impossible to overrate the importance of studying them *in situ*, so as to be enabled not only to connect the numerous aberrations, but even at times, perhaps, in a certain measure, to account for them; since it is by this process of inquiry that we are more likely to arrive at truth, than by the collation of treble the amount of individuals, at a distance, when anything like local phenomena in connexion with them must be entirely overlooked. So completely, indeed, are some of the Madeiran Ptini affected by isolation, and by an exposure to a perpetually stormy atmosphere, that they do not attain half the bulk on many of the adjacent rocks that they do in the more sheltered districts of the central mass; and so marvellously is this verified in a particular instance, that I have but little doubt that five or six species, so called, might have been recorded, had only a few stray specimens been brought home for identification, without any regard having been paid to the respective circumstances under which they were found. Judging from many hundred examples which I have submitted to a close comparison, the most constant of their characteristics would appear to be outline and sculpture, whilst size and colour are apparently the least to be depended on, and hence trifling differences may be often of specific indication in the former case, where in the latter much larger ones are worthless." Again, the observations on Tarphius, one of the Colydidæ, a family of Necrophaga, are replete with interest: prior to the publication of Mr. Wollaston's work a single species was known, and this of the greatest rarity; it was taken in Sicily by the late lamented Coleopterist Mr. Melly. Mr. Wollaston has added no less than fifteen Madeiran species, all of which appear to be abundantly distinct. "Of

the influence and economy *in situ* of such an assemblage it is not easy to speculate; suffice it therefore to remark that the enormous numbers in which they exist, when compared with the limits within which they are confined, would seem to point to some especial end which they may be presumed to fulfil amongst the insect population of those remote upland districts. Meanwhile it is far from improbable that, like many of the Nitidulidæ and the xylophagous groups, they may assist materially in the decomposition of the superfluous masses of loose rolling timber with which the damp ravines and dense mountain slopes of Madeira everywhere abound. To such localities it is that they are exclusively assigned, occurring in the greatest profusion in those spots which are the least accessible, and where consequently the primæval timber is, except by the hand of man, most untouched. In their habits the Tarphii are strictly nocturnal, adhering to the under sides of moist decaying logs of wood, felled timber, and even stones during the day, and being only active apparently by night. From 2000 to 5000 feet above the sea may be said to include their range; nevertheless they are more peculiarly abundant from 3000 to 4000 feet, and it is perhaps towards the upper edge of these bounds that they find their maximum. * * Considering the inaccessible nature of their favorite localities it is far from improbable that many species will remain for ever undiscovered, a possibility which is not lessened by the fact either of the remarkable manner in which they are able to counterfeit death, and so elude observation, or of the near resemblance of the dull rusty colouring of their uneven and inanimate-looking surfaces to the stones, lichen and portions of rolling wood to which in the day time they remain firmly fixed." We are all aware of the creaking sound emitted by Aromia moschata and many other longicorns; we all know that this noise is accompanied by a movement of the great central articulation of the body, that of the prothorax with the mesothorax, and we all attribute the creaking to the friction of some part of the prothorax on some part of the mesothorax. Mr. Wollaston is not content with this theory, although self-evident, but has been at great pains to discover the exact truth, and has detected and described the mechanical apparatus by which the sound is produced, and tested his conclusions by producing similar sounds at pleasure and with Nature's own instruments: he finds in the genera Deucalion, Parmena and Dorcadion, a narrow space in the shape of an isosceles triangle (the apex being turned towards the scutellum), which occupies nearly the entire length of the mesonotum, and which, from its brightness, appears at first sight perfectly smooth, but when viewed under a microscope is seen to be

covered with very fine transverse parallel and acute ridges, closely set together after the manner of a file; and it is by depressing and raising the prothorax, an act which alternately exposes and recovers the upper region of the extremely cylindrical mesothorax, that its under side is brought to play against this inner dorsal file, and by this process the strictulation is effected. "In order to convince myself," says Mr. Wollaston, "of the reality of this, I have relaxed many specimens of the genera in question, and have caused the sound artificially with the greatest ease." Although these Madeiran commentaries and quotations have already exceeded a reasonable length, I trust I shall be pardoned for making still another extract, in which the effects on insect life of a calm at sea are admirably set forth: the author is on the Northern Deserta or Ileo Chao, and is speaking of the Ptinus albopictus. "So perpetually," says he, "is that remote table rock played over by the breezes of the ocean, that even a temporary respite is almost an anomaly within its desolate area; and if such a crisis should chance at times to arrive, it is curious to note how every species of life, taking advantage of Nature's repose, comes forth to enjoy the calm. I shall not soon forget the pleasure I derived on the 5th of June, 1850, from the sudden effects of a lull, after an exposure to the blasts during several successive days, on this iron-bound isle, — how all things seemed to participate in the change, and literally to rejoice. Even the vegetation, as though released from its suffering, began to look up; whilst insects, unthought of before, filled the atmosphere as it were on the instant, as though experience had taught them that such tranquillity was but of short duration, and that if it were to be enjoyed at all not a moment was to be lost. It was on that particular afternoon that I first appreciated the prodigious numbers of the lilliputian Ptinus under consideration, which, though apparently scarce during the more boisterous period, now emerged by thousands on every side. From whence they came it would have been difficult to conjecture: * * they were in greater or less profusion everywhere, until, as evening approached and the winds began to return, as quickly as they came every one of them vanished."

With this sketch of the entomological labours of my friends—contrasting, so unfavorably to myself, with my own inactivity—I conclude this too lengthened Address: faint and imperfect as the sketch confessedly is, it still must amply suffice to show that Entomology with us is not on the wane: your exertions were never greater; they were never crowned with more triumphant success: this is a subject on which I may heartily and truthfully congratulate you, and as heartily

and as truthfully may I congratulate you on the state of the Society, on the solidity of our present position, and on the brightness of our future prospects: we have published largely, and met with a most encouraging sale; the number of our members has increased; our exchequer is full; our debts are paid. Heartily wishing that this prosperity may continue, that every success may attend our united and harmonious labours on behalf both of the Science and the Society, I now retire from that important office with which you have entrusted me, deeply feeling that no thanks of mine can make you an adequate return for the kindness with which you have invariably received me, and carrying with me into obscurity the most pleasurable recollections of my brief tenure of authority.

Black Hare shot at Brome.—During a battue at Brome, near Eye, the seat of Sir Edward Clarence Kerrison, Bart., in the early part of January, a hare perfectly black was shot in one of the plantations, and has been preserved by the honorable baronet. Seven years ago a similar specimen was shot in the same place, but none have been seen since.—*C. R. Bree; Stricklands, Stowmarket, February* 8, 1855.

On the three Species of Divers or Loons.—Of the first, the redthroated, it is almost needless to repeat that it is a common species, so far as relates to the "speckled loon," on most parts of our coast, though occurring, from its non-gregarious habits, in but small numbers. It may here be well to notice that in one instance I fell in with what appeared to be a small family party of the blackthroated diver. These five or six birds frequented for some time a small bay near Bembridge, and seemed most studious to keep up this family connection, until one day I succeeded in effectually dispersing them by a lucky cartridge which left two sprawling on the surface (of which however, by some strange inherent vitality, one contrived to escape), and after that I saw no more of the association. One of them was afterwards shot in my presence, and, after having passed through the ordeal of careful examination, was thrown into the water to wash away the blood, when, to the great surprise of the shooter, he swam and dived away most gallantly, not again to be so easily outwitted. The favourite food of the divers appears to be the sea-smelt or atherine, if I may judge from the result of several dissections. The next common is the great northern diver, and I may perhaps be allowed to say that its rarity, at least in the immature or winter (?) plumage, is generally overrated. With us at all events (at Bembridge) the bird was a regular winter visitant to the coast, and well known to the fishermen and "gunners." I shall not easily forget my delight when first the great northern diver fell before my gun, but I

have since learned to think more of my luck in killing the bird than of its actual scarcity. There seems, too, an impression current that the divers seldom make use of their wings, but from my own experience, and I have made the genus to a certain extent a special object of study, they *do* fly quite as much as could be expected in birds of such astonishing subaqueous facilities. They were in the habit of flying in and out of Bembridge Harbour, probably for the sake of food; and I have constantly, when out sailing, seen them on the wing over-head far out of gun-shot: nay, they have many times trusted to the air, "par préférence," whilst I was endeavouring to circumvent them; and this was also the constant habit of the horned grebe when we bore down upon him. It may seem unnecessary to allude to the loon's marvellous activity in diving, called as they are after this pre-eminent faculty, still I may safely say that of many shots I have fired at them, and within twenty yards too, I scarcely ever knew one to take effect, even with a percussion gun, unless the bird had the back of its head turned to the flash; and often when rising close to the boat a sort of spring and a momentary glimpse of its curving back was all I could catch of the hunted bird. Frequently, too, has one of these stately creatures, emerging close at hand, appeared to court a shot, till the result showed one might as well have aimed at a "Will o' the wisp." Their mysterious disappearance after a tedious chase is well known, and I should feel inclined rather to side with those who ascribe it to the power they have of using their beak alone for respiration while the body is all concealed, than to the more flattering conclusion of a fatally wounded bird entangling itself in sullen despair among the sea-weed at the bottom. The blackthroated diver is also probably less uncommon than is said; and the great difficulty of obtaining specimens, together with the impossibility of distinguishing the two smaller species until brought to bag, may serve to account for this. Though perhaps seldom procured, about an equal number passed through my hands, in the Isle of Wight, as of the great northern. Two interesting questions remain for the solution of some diligent observer: the first, respecting the plumage, as to whether any numbers of adult birds do regularly visit our South coast in winter, as is supposed from the comparatively few young that are reared annually; and it is as well to remember, on this point, how very much heavier are those few which are got in perfect plumage: further observations, too, are much needed on any birds found in the intermediate state, or in whatever condition whilst approaching the adult livery. The second point wanting confirmation is whether the redthroated diver still breeds in the northern isles of Scotland. It is much to be feared that the other truly indigenous species (blackthroated) is too much persecuted by the unscrupulous avidity of private egg-collectors (who too often spare neither nest nor parents), so as in no small degree to justify the apprehension that this fine bird will soon be numbered with the wild swan, the gray lag, the crane and the bustard, among glories ornithological long since departed, to the regret of every real lover of birds. As to the great northern diver, too, there seems considerable doubt whether it does at the present day nest upon British soil; and the several unaccountable instances of its occurrence in the early summer months, as when lately in full plumage it fell to the rifle of a friend on Lough Corrib, Ireland, tend in no small degree to render the solution still more difficult, but it is presumed, for that very reason, the more interesting.—*A. G. More; Trinity College, Cambridge, January*, 1855.

Rare Birds captured near Stowmarket.—During the severe weather from the 16th of January to the 7th of February, of this year, some rare birds have been taken in

this neighbourhood. I use the term "rare" of course relatively. Our position with regard to the coast makes many birds common there great rarities here. Ipswich is about twelve miles from Harwich, but the Orwell is tidal, and, in places, nearly a mile in breadth, so that it may almost be termed an arm of the sea. From Ipswich we are twelve miles, a tolerably sized canal connecting the two towns. It is this canal, I have no doubt, which brings up the birds from the sea.

Blackthroated Diver (*Colymbus arcticus*). In the beginning of February, when the snow covered the ground upwards of a foot, one of the gamekeepers of E. Bennett, Esq., of Buxhall Lodge, was coming into Stowmarket, when he saw a curious-looking bird struggling in the snow of a field by the road-side. He jumped over the fence, and gave chase: the bird could not rise, and was soon captured; it, however, made a most determined attack upon the aforesaid keeper's face, which so alarmed the man that he killed the kird. It was sent by Mr. Bennett to a bird-stuffer in this town, and upon examination I pronounced it to be a young specimen of the blackthroated diver. I subjoin a description for the sceptical. Beak as long as head, horn-colour, pointed; upper mandible longest and slightly curved at extremity; lower mandible reddish at base; both curved inwards. Plumage, upper surface:—head gray, mottled with darker colour; nape and upper surface of neck grayish brown; interscapulars, wing-coverts, back and tail-coverts grayish black, both sides of each feather being broadly margined with ash-gray, lighter on the tail-coverts; tail short, rounded, brownish black; wings — tertials and secondaries brownish black edged with ash-gray, primaries dark brown and unicolorous. Under surface:—throat and chin dusky white; upper part of neck for about two inches mottled with dusky; lower part of neck, breast and under surface of the body white; flank brown, edges broadly bordered with gray; feathers, under the wings, white; around and on each side of vent and extremities of wing and tail feathers dusky gray. Legs placed much beyond the centre of gravity; outer side dark green, inner light green; tarsus much compressed, 3½ inches long; toes four, three in front united by a membrane rounded superiorly; posterior toe slight, and attached by a membrane to the inner surface of tarsus. Dimensions:—from tip of beak to end of tail, 27 inches; from tip to tip of wings, 41½ inches; length of wing, 18½ inches; from carpal joint to end of first primary, 11 inches; from tarsal joint to end of first toe 4 inches, and inner toe 3 inches; beak from gape, 3¼ inches. It will be observed that in describing the beak I have said *slightly curved at extremity*. I am inclined to think that it is a mere abnormal variety: it is very slight, but enough to take off the pointed character of the beak. I believe this to be the first instance of the blackthroated diver being captured in this neighbourhood. A bird so northern in its habitat seldom visits even our eastern coast. I have given the description of this bird at length, as none is contained in Yarrell's excellent work: that gentleman refers his readers to the great northern diver, which he says is similar in plumage when young.

Common Scoter (*Oidemia nigra*). A specimen of this bird was taken last week in the snow, alive, at Clopton Hall, by Mr. Parker, son of Major Parker, the present high sheriff of the county. I have not seen this bird, but I am informed by the Rev. Mr. Freeman, who has seen and examined it, that it is a veritable scoter. Clopton Hall is five miles further from the sea, but one of the tributaries to our canal runs through the parish. They are trying to keep the bird alive.

Common Bittern. A specimen of this now rare bird was shot a few days ago at

Aspal, about ten miles from hence, by Mr. Freeman. It rose up in a wood, and took refuge alas! in a tree near, from which it was shot. It was very thin.

Hawfinch (*Fringilla coccothraustes*). A fine male specimen of this bird was taken about a fortnight ago, in a trap, at Old Newton, near here. It is now in my collection. —*C. R. Bree; Stricklands, Stowmarket, February* 8, 1855.

Note on the Eagle which is said to attack the Trained Falcons of Asiatic Falconers. —In the 'Zoologist' (Zool. 3648 and 4052) I drew attention to some passages in the works of various authors which appeared to throw some light on the above curious subject. I now beg to call attention to a statement bearing on the same matter, and contained in the recently published first volume of the 'Catalogue of the Birds in the Museum of the East India Company,' a volume which, it may be observed, is not limited to a simple list of specimens, but which also contains a very great amount of interesting information as to the habits of the species therein enumerated. The editor of the 'Catalogue,' under the head of Aquila Nævioides (called in India the Wokhab), quotes the following, from a paper published by Mr. Jerdon, who in his turn refers as his authority to the notes of Mr. Elliot, viz., "The wokhab is very troublesome in hawking after the sun becomes hot, mistaking the jesses for some kind of prey, and pouncing on the falcon to seize it. I have once or twice nearly lost shaheens in consequence, they flying to great distances from fear of the wokhab." The Aquila Nævioides is said to be in the habit of plundering other raptorial birds of their prey, a circumstance which, if correctly asserted, would give great probability to Mr. Elliot's theory as to the cause of these eagles attacking trained falcons.—*J. H. Gurney; Catton, Norfolk, February* 14, 1855.

The Lapland Bunting (Plectrophanes lapponica) *in Norfolk.*—I have the pleasure of recording a specimen of this rare bunting, which was netted during the last week of January, at Rostwich, near Norwich. This bird is apparently a male in winter plumage, very lively, but far from shy, and seems to thrive well in confinement.—*H. Stevenson; Norwich, February* 16, 1855.

Remarkable Variety of the Woodcock.—Mr. Cooper, of Radnor Street, St. Luke's, has favoured me with the sight of a most beautiful specimen of the woodcock, widely differing from the normal colouring of the species. Every part of the plumage was of a delicate fawn colour, just that tint which naturalists have termed *isabellinus*. Every sportsman is acquainted with the beautifully distinct markings of the woodcock in its normal state of plumage, markings so wonderfully represented in Bewick's figure, the finest bird-picture in existence: all these markings are just indicated, and no more, in Mr. Cooper's specimen; you could catch them, like reflected light, appearing in some positions and vanishing in others.—*Edward Newman; February* 19, 1855.

Occurrence of the Shag (Carbo cristatus), *the American Scaup* (Fuligula maritoides) *and the Continental Wagtail near Scarborough.*—I have an adult female shag (a rare bird with us) which was shot on the South Sands. A fine example of the American scaup was killed from the Light-house pier: it was purchased by I. Tindall, Esq., of this place, who is having it preserved. A continental wagtail was shot by a friend of mine, Mr. H. Jackson, an intelligent farmer living at Deepdale, a short distance from here: it was feeding near his sheep, in a turnip-field.—*Alfred Roberts; King Street, Scarborough, January* 23, 1855.

Note on the Great Vulture of California (Cathartes *vel* Sarcoramphus Californianus). By Alexander S. Taylor, Esq., of Monterey. Communicated by J. H. Gurney, Esq.

The great Californian vulture — the northern representative of the condor of South America—is a species which is not only one of great intrinsic interest, but also one of extreme rarity in European collections, and respecting which we possess but meagre and scanty information.

The following notes, written on the spot by my ingenious and able friend Mr. Taylor, will, I am sure, be acceptable to the readers of the 'Zoologist,' and will require no comment from me, except it be to remark that, should the statement respecting the edible qualities of this vulture's egg excite a doubt, it is to be remembered that Le Vaillant makes a similar observation respecting the eggs of two of the large vultures of Southern Africa.

J. H. Gurney.

Catton, Norfolk, February 12, 1855.

A fine specimen of this bird was killed on the beach at Monterey, a few days ago. It was a female, and weighed, when killed, 20 lbs. avoirdupois. The following are its dimensions and proportions: from beak to the end of tail-feathers, 4 feet 6 inches; from tip to tip of wing, stretched out, 8 feet 4 inches; one wing, 3 feet 3 inches; tail-feathers, 12 in number and 15 inches long; from ruffle on the neck to vent, 2 feet 9 inches. It has 32 brachial feathers on each wing; the five long outer wing-feathers measure 2 feet 5 inches each; its breadth across the breast-bone is 8 inches; under the wings and over the breast it has a long triangular layer of dirty white feathers, and the outside of the lower part of the wings is also dashed with a few feathers tipped white.

The head, down to the commencement of the beak, is covered with a beautiful lemon-coloured loose skin. The beak is $1\frac{3}{4}$ inch long, and curved over with a point as hard as iron, with a waved edge as sharp as a knife: the under beak is a perfect half cylinder, into which fits, with the nicest accuracy, a hollow tongue of the same shape: this tongue is a curious feature, being $1\frac{7}{8}$ inch long by $\frac{1}{2}$ an inch broad,

and is serrated with a hardened edging inclining down the gullet, which the bird uses with great force and power in reducing its food for digestion previous to swallowing.

The head is 7 inches long, and is barred over with a triangular-shaped band of featherets on a naked white skin: across the crown it measures 3 inches. The neck is bare of feathers, is of a pale dirty flesh-colour, and is 7 inches long from the base of the skull to the ruffle at the root of the neck; it is furnished with a ruffle of stiff broad feathers, with elongated points at the root of the neck, into which it buries its neck when at rest. Its legs are of a dirty white colour, and measure 10 inches from the knee-joint to the end of the claw of the main toe. The feet consist of four toes, which are armed with strong black curved claws; the middle toe is $5\frac{1}{2}$ inches long, which includes a claw of $1\frac{1}{2}$ inch in length; the hind toe with claw is only $1\frac{1}{2}$ inch long. The breadth of the foot across the palm is $2\frac{1}{4}$ inches. The length of the legs, from the hip-joint to the end of the middle toe, is 15 inches.

The egg of the bird, as I am informed by a fifteen-year resident of California, is 3 inches broad by 5 inches long, about one-third larger than a goose's egg. Its colour is a dirty pale blue, spotted brown, and it is nearly as thick as an ostrich egg. The same person informs me that the female lays only one egg during a season, and makes her nest on the ground in the ravines of the mountains, and generally near the roots of the red-wood and pine trees. It is three months before the young bird can fly.

The eye of the bird is 1 inch long by 1 inch broad, and weighs half an ounce; the iris is a beautiful light pink. The brain is shaped like a heart flattened, and weighs 1 oz.; it measures $1\frac{1}{2}$ inch in breadth and length. The heart, lungs and liver are nearly the dimensions of a year-old pig's; the gut is short and wide; the gall-bladder is $\frac{3}{4}$ths of an inch long. The bird, when erect, stands above 4 feet from the ground, and, from its huge wings, when spread out or even closely folded, looks a mountain of black feathers. The feathers are of a uniform dusky brown and black colour, with the exceptions mentioned. The body is covered closely with a long lead-coloured feathery down, with a thick skin (or hide rather) which is underlaid over the whole body, and particularly its under part, with a compact layer of bright yellow fat, of a strong musky smell. The flesh is of a bright arterial red, and, with large flakes of air-cells under the wings and breast-sides, copiously fills out the contour of the animal. The muscular and bony development of the wings, neck, head and legs, is enormous, and

gives it immense strength and power in flight, and in attacking and devouring its prey.

Such is the description from nature of the Sarcoramphus Californianus or condor of the Rocky Mountains and the North-west.

This bird is closely allied to the condor of the Andes, but is totally distinct in features and habits from the turkey buzzard, with which it has been confounded, and which is rarely more than one-third its size. It soars at elevations of from 6,000 to 16,000 feet, and is found throughout the length and breadth of the Rocky Mountains of California and the North-west coasts, and is sometimes seen near San Francisco. It is particularly fond of fish, and is often found on the sea-shore watching for fish thrown on the beach, or even steals them from the Indians when catching salmon and mountain trout in the lakes and rivers of the great plains of the coasts. A dead whale thrown ashore is sure to bring some of them in sight, and a hunter killing a deer in the mountains is confident of their appearance as soon as the animal is wounded. They are also said to attack wounded deer or other animals, and kill them, and sometimes to carry off alive smaller creatures. They are also stated to carry off fish caught in rivers, sea and lake shallows; and though they will eat dead meat, they will not, like the turkey buzzard, eat carrion,—but this last wants further confirmation. When hungry they are exceedingly difficult to approach, but when gorged with food they are stupid, and fly or move with slow unwieldy motions. They soar at great heights, in circles, like the turkey buzzard, without moving their wings; but on a straight line they fly and sail by starts and flaps, at intervals of four or five minutes. Its range of vision is probably as great as that of the Andean condor, which is said to sight its objects at a greater distance than any other living creature.

The foregoing description will answer for the male bird, it being generally larger, and the colour of its head, neck and body being of rather brighter and deeper tint. The white feathers of the under wings are not so thick and numerous in the female as in the male.

Since writing the above, a hunter has informed me that three years ago he caught two young condors in the red woods of Santa Cruz county, and kept them more than a month. When young they have a strong smell, and are three months old before they fly. He added that the female is smaller than the male, and this without doubt, as he has often observed them. She lays two eggs in a year, which are hatched in about six weeks, near the middle of March: the eggs weigh about twelve ounces, and are better eating than any other eggs. They

sometimes lay on the ledges of high rocks, but quite as often on tall trees, in the old nests of hawks and eagles. The plain diggers of Northern Mexico use the quills for putting their gold-dust in.

Three of these birds will eat a deer, and when they attack a man or animal, in defence, will nick a lump of flesh out in a minute. The barrel of the outer wing-feathers is 4 inches long by $\frac{3}{8}$ths of an inch in diameter: when the bird is standing, the long wing-feathers will overlap those of the tail more than 6 inches. The upper beak is of a horny white, with a thick, sharp, solid, curved-down and pointed end, and overlaps the lower by $\frac{5}{8}$ths of an inch. The mandibles are fully $\frac{1}{16}$th of an inch thick. The ear is $\frac{1}{2}$ an inch long, and $1\frac{1}{2}$ inch from the eye, at the termination of the upper jaw bone.

When flying the white band of the wings and breast does not extend over the breast, but the breast and belly appear as an intermission of black. They float in the air rather than sail, and their motions aloft form the most elegant and graceful feature of the bird's habits.

On the 13th instant, at one o'clock in the afternoon, some object attracted a flock of these vultures. At first one suddenly appeared, but in the course of fifteen minutes I observed twenty of them, circling at an altitude of some four thousand feet, and immediately over the beach. When in the air they may be distinguished with a spy-glass from the turkey buzzard, by the white band under the wings. They are generally seen on the sea-shore at Monterey, in the latter fall months, in clear weather; but sometimes they make their appearance in a foggy atmosphere. As they come so they go—a company will be out of sight in fifteen minutes. They appear "to drop from some cavern in the sky," as described of the vulture of South Africa, by Le Vaillant, many years since.

One of these birds, killed a few days ago in Carmel Bay, near Monterey, a friend informs me, measured (including breast) 13 feet from tip to tip of wing.

A. S. Taylor.

November, 1854.

Correction of an Error.—I wish to correct an error into which I have unintentionally fallen in my "List of the Mollusca found in the Neighbourhood of Banbury" (Zool. 4540). The Pisidium cinereum is not found in this neighbourhood, the specimens [thus named] being very good ones of P. pusillum, as I have been kindly informed by Mr. Webster, of Birkenhead.—*R. H. Stretch; Parsons Street, Banbury, February* 21, 1855.

The Entomology of Malacca. By Alfred R. Wallace, Esq.

To an entomologist Malacca seems, at first sight, a much finer locality than Singapore: the former is one of the very oldest European settlements in the East, while the latter is almost the newest. In the one, patches of the primæval forests remain on the hill-tops only, and all the low grounds are covered with new plantations of gambic, pepper and nutmeg, which afford scarcely an insect worth collecting: in the other, though for miles round the town the virgin forest has long since disappeared, its place is supplied by old plantations and shady groves of magnificent fruit trees, in which many of the insect inhabitants of the jungle appear to thrive as well as in their original domains. Further in the interior the whole country gradually merges into the vast forests of the centre of the peninsula, where the numerous Malay villages, embosomed in masses of cocoa-nut, jack and durian trees, and the settlements of Chinese tin miners, with the numerous paths and roads made by them, offer many tempting localities for the entomologist. And the promise is well fulfilled; for though some particular groups were far more abundant at Singapore, yet, taking insects of all orders, the superior richness of Malacca was very striking. My first locality was near a Chinese mining settlement, about twelve miles inland. My servant getting fever, I was obliged to return to Malacca in less than a fortnight, where I was attacked myself, and it was another fortnight before I was well enough to leave. I then went to a government bungalow, seven miles further in the jungle, and remained there a month. From thence I made an excursion to Mount Ophir, in the interior, where I remained a week, and then returned to Malacca and Singapore.

It was at my earliest station that I first fell in with the magnificent Ornithoptera Amphrisius, but for a long time I despaired of getting a specimen, as they sailed along at a great height, often without moving the wings for a considerable distance, in a manner quite distinct from that of any other of the Papilionidæ with which I am acquainted. To see these and the great Ideas on the wing is certainly one of the finest sights an entomologist can behold. It was, however, at my next station, and at the foot of Mount Ophir, that I first met with many of the fine Eastern Papilios, which are certainly superior in beauty and variety to those of South America: by variety I do not mean the number of species, but the different forms and style of colouring. Of the handsome green and blue spotted butterflies, P. Agamemnon, &c.,

I obtained three species, one I think new. This group is eminently beautiful. They fly with the greatest rapidity of any Papilios; the eye can scarcely follow them; in fact, they much resemble in habit the humming Sphinxes, and hover over flowers, or more frequently over damp places on the ground, with a constant vibration of the wings. P. Antiphates is the only species of the Protesilaus group, and is not very common. The grand P. Memnon flies very rapidly, and seldom settles. P. Iswara, and another species allied to P. Helenus, but I think new, have an undulating flight, very like that of the South American Morphos, or even sometimes approaching that of the large Noctuidæ, and they rest with the upper wings deflexed over the lower. The beautiful P. Polydorus flies weak and low, exactly like P. Æneas and allied species in South America. Then there are the elegant white and black marked species, P. Delessertii, P. Leucothoe, P. Nox, and a very fine species allied to Coon, which (if it is not P. Neptunus, *Guér.*, of which I have no description) is quite new. But my greatest treasure among the Papilios was a magnificent green and gold powdered species, which (if it is not P. Crino or P. Brama) is also new. If we add to the above, Papilio Epius, P. Demolion, P. Pammon, and P. Tetrarchus, we have a series which for variety of form and colouring, as well as for size and beauty, no country can surpass.

But though we may claim for the Eastern Papilionidæ, and also for the Pieridæ, a superiority over those of America, it is far different in other groups. The Euplæas, though very beautiful, cannot compete with the exquisite Heliconidæ, to which they are so closely allied; neither have I yet met with any Nymphalidæ here which can compare with the Epicalias, the Callitheas and the Catogrammas of the Amazon. I obtained, however, several fine species of Charaxes and Adolias. The Cyllo Lowii of Borneo also occurs at Malacca, and the lovely little long-tailed Lycænidæ are the only group that at all compete with the Erycinidæ of America.

Turning now to the Coleoptera, the most remarkable feature is the almost total absence of those hosts of elegantly varied Longicorns which so delighted me at Singapore. The beetles altogether were exceedingly small and scarce, requiring the most persevering search to find any at all: yet they were very different from those of Singapore, and (principally through the persevering efforts of Mr. G. Rappa, a gentleman of Malacca, who spent a month with me in the jungle, and accompanied me to Mount Ophir) I was enabled to add 260 species to my already extensive collection.

The Therates dimidiata of the Singapore jungle was replaced at

Mount Ophir by a larger species, and the two fine Catascopi of the former place had also their Malacca representatives. I here obtained my first species of Tricondyla, and in the centre of one of the densest and darkest jungles was so fortunate as to find the strange Mormolyce phyllodes, under a huge boletus,—just where, from its resemblance to the curious Thyreoptera of Singapore, I had expected to discover it. Numerous species of Apoderus were very remarkable among the Curculionidæ, while most of the curious Anthribidæ of Singapore were wanting. Many exquisite species of metallic Cassidas were found for the first time; the Heteromera, too, were very numerous, and the Elaters and Buprestidæ furnished me with many new species. Of Lucanidæ I obtained eight species, mostly small, though one (the Dorcus Titanus, *Boisd.*) is quite a giant.

Amidst this variety of Coleoptera the most remarkable circumstance is the almost entire absence of the great family of the Cetoniadæ. Though constantly searching for them I procured but five species, and those all small and single specimens.

But it was in the other orders that I obtained the greatest amount of novelty and variety. In the little streams about the foot of Mount Ophir were hosts of new and beautiful dragon-flies, and even on the summit, at an elevation of 4000 feet, I obtained one species. Of these interesting but much-neglected insects I nearly doubled my collection, which now amounts to seventy-two species of true dragon-flies. The Hemiptera and Homoptera were perhaps most abundant of all, containing many fine species of Pæciloptera and Cercopis, as well as extraordinary Reduviidæ and brilliantly coloured Scutelleræ. On the muddy pools in the path to Mount Ophir were numbers of a very large and handsome Notonecta, which took the way as we approached, but, settling on the adjacent foliage, were easily captured. Of these interesting insects I added a hundred species to my collection, which now amounts to 228 species. The Orthoptera, though much fewer in numbers, were very interesting for the great variety of the Phasmidæ and Mantidæ. I have species of Mantis coloured like wasps, others like ants, and one brilliantly metallic. The winged Phasmidæ appeared endless: for a long time every one I captured was a different species, and the greater portion remained to the last unique. The Diptera, too, were very interesting. Among them I obtained the extraordinary Celyphus obtectus, or an allied species, which has the head of a fly to the body of a Scutellera among the Hemiptera. I also obtained three species of the curious stalk-eyed flies.

In order to give some idea of the entomological riches of this part

of the world, I will add a summary of my collections at Singapore and Malacca, made within six months of my landing at the former place, but of which not more than four months were spent in collecting. It will also show, I hope, that I have given equal attention to every order of insects.

Coleoptera	940	species.
Lepidoptera (Diurnes 237) . .	353	„
Hymenoptera (Ants 35) . . .	173	„
Hemiptera 143; Homoptera 85 .	228	„
Neuroptera (Libellulidæ 72) . .	77	„
Orthoptera	70	„
Blattæ and Forficulæ . . .	26	„
Diptera	136	„
Total . .	2003	„

ALFRED R. WALLACE.

Sarawak, Borneo,
November 25, 1854.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

February 5, 1855.—JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for February; by the Editor. The 'Athenæum' for January; by the Editor. The 'Literary Gazette' for January; by the Editor. The 'Journal of the Society of Arts' for January; by the Society. 'Proceedings of the Royal Society,' Vol. vii. No. 7; by the Society. 'Report of the Council of the Art Union of London for 1854,' 2 copies; by the Art Union. 'Revue et Magasin de Zoologie,' Nos. 11 and 12, 1854; by the Editor, M. Guérin-Méneville. Specimens of the silken fabric woven by caterpillars of Saturnia pavonia-media, accompanied by figures of the insect in its different stages of growth, with a summary description thereof, and the method used to procure the silk; presented by Herr Pretsch, through Mr. Newman.

President's Inaugural Address.

The President returned thanks for his election, and delivered an Inaugural Address, which was ordered to be printed.

Vice-Presidents.

The President nominated as his Vice-Presidents J. O. Westwood, Esq., E. Newman, Esq., and H. T. Stainton, Esq.

Exhibitions.

Brigadier Hearsey exhibited a case of Lepidoptera and three cases of Coleoptera, just received from Sylhet. Among the rarer Coleoptera were pointed out Jumnos Ruckeri, ♂ and ♀, numerous species of Cicindelæ and Lucanidæ, Lamia Stanleyi and Buprestis Edwardsii.

Mr. Stevens exhibited three perfect specimens of the rare beetle Cheirotonus Macleayii, from India.

Galls produced by Cynips Quercus-petioli.

Mr. Stainton exhibited a bunch of galls gathered from an oak near Exeter, and of the same kind as those exhibited by Mr. Rich at the November meeting. He also read the following extract from a letter of the correspondent who had forwarded the galls:—

"Having observed, in the 'Gardener's Chronicle,' a notice of the Proceedings of the Entomological Society, in which the subject of the oak-galls of this county was spoken of, I beg to say that they are more numerous now than at any other time I have observed them. They are confined to the young and mostly the long shoots which spring from oaks which have been cut down to the ground, and to those old stumps which grow in hedges, and are subject to be cut down in repairing the hedges, perhaps once in three or four years, or it may be more. It is curious to observe that, should an oak tree stand in a hedge, it is only the lower spray which is selected by the insects: it is exceedingly rare to see a gall upon the higher branches of a tree. It may be taken as a rule that the insects never attack a tree or bush above ten feet from the ground, but the nearer the ground the more numerous the galls. Some dwarf oak pollards I saw the other day, near Stoke Wood, which had been completely denuded of their branches last winter, and of course last spring the trees produced a goodly crop of young shoots all round: to see these trees now without any leaves, and the young one-year old branches almost covered with galls like a gooseberry bush laden with fruit, is very curious and striking.

"It is rather difficult now to find any galls containing insects, for it appears that a portion of the insects make their escape in the autumn and the rest in the spring following; but the little prying tits (*Parus cæruleus*) appear to have found them out, and thousands are devoured by these birds: it is astonishing how soon they work a hole and extract the larva, which no doubt is a very dainty morsel, particularly this hard, frosty weather.

"As for the species of Cynips which causes these galls, if it is C. Quercus-petioli certainly that name was wrongly applied, for the galls on the petioles of the leaves of oak never attain that woody consistence which is peculiar to this kind of gall. I sent some of these galls, three or four years ago, to Mr. Westwood, through the 'Cottage Gardener,' asking for the name, and received for answer that it was Cynips terminalis."

Mr. Stainton pointed out that the galls now before the meeting were well figured by Réaumur,* and that no subsequent author appeared to have referred to his figures.

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* 'Mémoires' tome iii. 452, pl. 41, figs. 7—15.

Indian Method of preparing the Silk of Bombyx Cynthia.

Mr. Westwood read, from the 'Journal of the Asiatic Society of Bengal,' vol. vi., brought by Brigadier Hearsey, the following account of the method used in India to prepare the silk from the cocoons of Bombyx Cynthia.

"The cocoons are put over a slow fire, in a solution of potash, when the silk easily comes off: they are taken out, and the water slightly pressed out; they are then taken one by one, loosened at one end, and the cocoon put over the thumb of the left hand; with the right they (*sic*) draw it out nearly the thickness of twine, reducing any irregularity by rubbing it between the index and thumb: in this way many cocoons are joined on. The thread is allowed to accumulate in heaps of a quarter of a *sur* (*sic*); it is afterwards exposed to the sun or near the fire to dry; it is then made into skeins, with two sticks tied at one end, and opening like a pair of compasses: it is then ready to be woven, unless it has to be dyed."

Mr. Newman read the following note, intituled

"*A Word for the Cockroach.*

"'There is nothing new under the sun:' so says the proverb. I believed, until a few days back, that I possessed the knowledge of a fact in the dietary economy of the cockroach of which entomologists were not cognizant, but I find myself forestalled; the fact is 'as old as the hills:' it is that the cockroach seeks with diligence, and devours with great gusto, the common bed bug. I will not mention names, but I am so confident of the veracity of the narrator that I willingly take the entire responsibility. 'Poverty makes one acquainted with strange bed-fellows,' and my informant bears willing testimony to the truth of the adage: he had not been prosperous, and had sought shelter in a London boarding-house: every night he saw cockroaches ascending his bed-curtains; every morning he complained to his very respectable landlady, and invariably received the comforting assurance that there was not a 'black beetle' in the house: still he pursued his nocturnal investigations, and he not only saw cockroaches running along the tester of the bed, but, to his great astonishment, he positively observed one of them seize a bug, and he therefore concluded, and not without some show of reason, that the cockroaches ascended the curtains with this especial object, and that the minor and more odoriferous insect is a favourite food of the major one. The following extract from Webster's 'Narrative of Foster's Voyage'* corroborates this recent observation, and illustrates the proverb which I have taken as my text:—'Cockroaches, those nuisances to ships, are plentiful at St. Helena; and yet, bad as they are, they are more endurable than bugs. Previous to our arrival here, in the Chanticleer, we had suffered great inconvenience from the latter, but the cockroaches no sooner made their appearance than the bugs entirely disappeared: the fact is that the cockroach preys upon them, and leaves no sign or vestige of where they have been: so far it is a most valuable insect.'"

Coccus arborum-linearis, Geoff.

The President read the following extract of a letter from Dr. A. Fitch:—

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* 'Foster's Voyage,' Vol. i. 373.

"My esteemed friend,—I take the liberty to enclose to you some pieces of bark covered with the scales of a Coccus which is making appalling havoc in the orchards of Illinois and Wisconsin, and is abundant in my own neighbourhood. I have supposed this to be the Aspidiotus linearis (Coccus arborum-linearis, *Modeer*, *&c.*), but have at hand no good description of that species, and am not without suspicions that it may be your A. Ostreæformis or conchiformis, these names being far more applicable to these scales than is that of linearis. As this insect will be embraced in the Report on insects injurious to fruit trees, which I am now preparing (for the New York State Agricultural Society, pursuant to directions of the State Legislature), I wish to be more certain with regard to its true name. A word from you, in reply to my inquiry, will be very gratefully received."

The President exhibited the insects *in situ:* they were the Coccus arborum-linearis, *Geoff.*, and the C. conchiformis he believed of Gmelin. The President remarked that "It is a subject for congratulation that these matters are being taken up by the State, and, from the valuable work of Dr. Harris having reached a second edition, it is evident these important objects will in future not be neglected in the United States."

Proposed Monograph of Elateridæ.

The President said M. Candeze of Liege, one of the authors of the 'Catalogue des Larves des Coléoptères,' had written to him to make known his intention of publishing a complete Monograph upon the Family Elateridæ, which he estimates at 3000 species. He solicits the assistance and cooperation of the entomologists of this country, by the loan of specimens, especially those of the East Indies and Australia. Most of the professors in the different cities of Europe have promised to lend him specimens for description, which he undertakes to return speedily.* He is one of the pupils of Professor Lacordaire, to whom the Catalogue is dedicated; and the President will be happy to transmit to him any specimens which the Members are willing to send him, provided they be entrusted before the end of February, when his friend will leave London.

Note on Psyche helicinella.

Under this title Mr. Douglas read the following remarks:—

"More than a century ago Réaumur, in his 'Mémoires,'† recorded the discovery of some curious heliciform cases, which he believed to be those of the larvæ of a moth, although he reared from them only 'une petite mouche noire et à quatre ailes,' which Siebold thinks must have been a Chalcis parasitic on the larva.

"Professor Siebold,‡ in a notice of the recent discovery by several entomologists of helical cases, which he regards as identical with those mentioned by Réaumur, states the curious fact that none of the finders thereof, nor any other entomologists, had

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* England, he writes, has not responded to his appeal in the name of Science, which has been made to the Entomological Society of London through Mr. Westwood. His first volume will appear at the end of the summer, and he especially wants the genera Agrypnus, Campsosternus, Hemops and Crepidomenus.

† Tome iii. Part 1, 12mo, p. 249.

‡ Trans. Ent. Soc., Vol. i. n. s., page 238.

up to that time had the good fortune to rear from any of these cases a winged Lepidopterous insect, but either a Chalcis, a Pteromalus, or a vermiform female like that of a Psyche, which Siebold named provisionally P. helix.

"Herrich-Schäffer described and figured* a Psyche helicinella, male, from specimens sent from Sicily by Mann, who only suspected they had escaped from spiral cases which he found in the vicinity of their capture.

"Bruand† has described and figured a Psyche helicinella, male, but does not state that he ever identified the perfect insect with the case. On the contrary, speaking of the inhabitant of the helical cases, he says that 'the caterpillar is difficult to rear; and for my part, after three unsuccessful attempts, I have ceased trying to obtain the imago in captivity. It is probable that some atmospheric conditions (the morning dew for example) are necessary to its coming forth. The caterpillar fed quite well up to the time of its transformation, then it commenced to wander about in the vase or box in which it was placed, and at length fixed itself near the partition; . . . then nothing came out—it died miserably.' Neither does he state that he has reared the male from the *pupa* found in the natural habitat, so that it may be inferred he also figured the insect from captured specimens.

"Lastly, M. Nylander has recorded‡ that he raised from a helical case which he found in 1853, in the South of France, a male Psyche.

"Whether the spiral cases, seen by so many observers, all belong to one species of larva is not certain, but, assuming that they do, it would seem that M. Nylander has been the first to rear the male insect, which he refers to Psyche helix, *Sieb.* = P. helicinella, *H.-S.*

"The larvæ inhabiting these spiral cases appear to be polyphagous, having been found on Cheiranthus odoratum (*Vallot & Tarnier*), Teucrium Chamædrys (*Bruand*), Anthyllis vulneraria, Lotus corniculatus, Gnaphalium arenarium and olive-trees (*Zeller*), Atriplex laciniata (*Kollar*), and Artemisia vulgaris (*Reutti*).

"I have thought it worth while to collate and bring these facts before the Society, as I think it probable, judging from the wide range of the species (it being generally distributed in Italy, France and Germany), that it may be found in this country, if our collectors know what to look for. There also attaches to the species another consideration of interest, it being one of those insects of which fertile eggs are constantly laid without the intervention of the male, as affirmed by Siebold and Reutti.

"I avail myself of this opportunity to remark that out of the eighty-two species of Psychides enumerated by M. Bruand, only ten or eleven have yet been detected in Britain. When we remember that of this latter number two§ are not known on the Continent, I cannot but think that we have to find in this country some of the continental species, and probably some more not yet recognised abroad."

Descriptions of Lucanidæ.

Mr. Westwood read a paper descriptive of many new species of Lucanidæ, illustrated with figures of the insects described.

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* System. Bearbeit., Bd. ii. figs. 108, 109.

† 'Essai Monographique sur la tribu des Psychides,' p. 73.

‡ 'Annales de la Soc. Ent. de France,' 1854, p. 336.

§ P. reticella, *Newm.*, and P. inconspicuella, *Stainton* (M. Bruand assigns both these names to Mr. Curtis).

New Part of the 'Transactions.'

Part 3 Vol. iii. of the 'Transactions,' published in January, was laid on the table. —*J. W. D.*

SOCIETY OF BRITISH ENTOMOLOGISTS.

Annual Meeting, January 2, 1855.—Mr. H. HARDING, President, in the chair.

The Secretary laid before the Members a statement of the affairs of the Society.

The President said that it gave him great pleasure to hear, from the Report read by the Secretary, of the flourishing state of the Society. There was only one drawback—the slow progress made in the addition of species to its cabinet during the past year: he hoped the Members would bear this in mind, and make up for it in the ensuing season.

The President then said "According to custom I will, with your permission, take a review of the past year. The season of 1854 has by most entomologists been considered a very bad one: the beautiful mild weather in the spring is, without doubt, remembered by all; vegetation felt the influence of the bright sun and warm nights; many larvæ were making rapid progress in consequence of the early bursting of the young buds, but a series of cold nights and blighting winds from the North-east, until the early part of June, destroyed them. On the 10th of June I went to the coast: what was the prospect of vegetation there? the whitethorn, which should have been in blossom, had its leaves blackened and dried up: where now were all the larvæ which were called into life by the early spring? all dead for want of food. This and the late cold weather was no doubt the cause of the bad season for many species: the Noctuæ, excepting in a few instances, made their appearance in the usual course. Through the exertions and enterprising spirit of our entomologists, however, many rare and some new species have been taken, for some account of which I refer you to Stainton's 'Entomologist's Annual,' which is now before me on the table, a work which has been kindly presented by the author, who I hope may live long to continue it. I am much pleased with the observations of the editor at page 3: they breathe a true scientific spirit, not always met with even in those calling themselves scientific men; but it is a spirit that ought to animate all inquirers after truth. In conclusion, I would remind my friends that there is a great deal to be done among the smaller Lepidoptera: many discoveries are in store for those who will seek them, but it ought always to be borne in mind that they must be diligently sought after. I intend in a few weeks to begin the campaign for 1855, and exhort all my entomological friends to do likewise. Science 'expects every man to do his duty.'"—*J. T. N.*

Local Lists. By the Rev. W. H. Hawker, M.A.

"Why sleeps he not when others are at rest?"
Byron

Some time ago a book was published by a nobleman, which one of the Reviews thus criticised, "'Things hoped for, by Viscount ***'—and by nobody else." I will not thus summarily deal with "Things hoped for, by John Scott, Esq.," which appeared in the 'Zoologist' for September last, but wish merely to make a few friendly suggestions thereupon.

To hope for a thing implies, at least in this case, that the thing hoped for does not exist. Now many of the things that Mr. Scott is hoping for have already entered upon their existence (for instance, local collections and lists, and popular lectures on Natural History), quietly, perhaps, and unobtrusively, but not the less really. Nothing in nature or science is born full grown, "parva * * primo, vires adquirit eundo," and it would take away the chief charm of the study of Natural History, if, the moment we entered upon the zealous pursuit of any particular branch, everything connected with it were to burst upon one with a hop, skip and a jump, and a "here we are!" like the clown in a pantomime. Nature is a coy maiden, who will strongly resent any rough handling, and will only by degrees, in proportion as you cultivate her acquaintance, unfold all her charms to you: she is no coquette, and if she courts your attention it is more by her retiring modesty than by any meretricious display of her riches. I remember, when on the Continent, experiencing a feeling almost of disappointment at seeing Bath whites and Camberwell beauties flaunting about in such profusion, and felt almost inclined to say, "I am ashamed of you—I really thought better of you." The same feeling is expressed by a friend of mine, who, writing me a description of some of the New Zealand and Australian localities for ferns, says, "Ferns are really too numerous in New Zealand—they almost cease to be interesting from their vulgarity. In South Australia, for the same reason, Adiantum ceases to be lovely." I merely adduce these instances to show that it is the need of "patience and perseverance," and the *gradual* mastering of *difficult* passages, that renders the book of nature so interesting.

To return to the 'Things hoped for.' I find there a "desire and wish to see men spring up with minds so large as to compete with

those departed and on the wane." Mr. Scott is not the first person who, since the time of Cadmus, has wished to make men spring up ready armed from the ground. But who, I ask, are to be these universal regenerators of systems and nomenclatures? I myself do not despair of seeing men rise up who will possess the peculiar talent of grasping all the discoveries subsequent to the last generally received systems, and of reorganizing those systems; but you may depend upon it, that, as we are told that "great occasions make great men," so, when the proper time comes, the demand will, in this case, though it does not universally, create a supply; and, until that time comes, a set of mere collectors and observers of nature will no more be able to make themselves great by inventing a lot of fantastic names, than you would be able to keep them to any one system (and Mr. Scott says this is a "necessity") so long as you allow them to alter generic and specific names at pleasure.

"Not be tied by old names and defunct lists"! Why, where should we be without them? If it were not for the labours and lists of Linnæus and others, whose systems and names (and perhaps their *names* more than their systems) are European, where should we be now? How would you or I, when looking over some Continental collection, explain to the curator, Monsieur This or Herr That, that the garden white was a butterfly of by no means rare occurrence in one's native country? If the collection was so fortunate as to boast a specimen, one could of course point to it as a child or the learned pig would to "B was a Butterfly!" But suppose the specimen was wanting, how could you express yourself, unless you had the common ground of some universally received, though perhaps, in some respects, imperfect nomenclature? Those who come nearest to Linnæus and the ancients in science appear to be the most careful and jealous to avoid altering the existing nomenclatures.

Again, many of our most successful entomologists would, if left to name their captures themselves, make use of Her Majesty's English, which they understand, in preference to obsolete languages, of which they may chance to know but little. Then an insect might rejoice in as many aliases as a London pickpocket, or amongst birds that unfortunate Caprimulgus, and interchange of ideas and of specimens would be next to impossible. Thus we should have the same insect called, according to trivial association, "the neglected rustic" by one person, "the pale puss" by another, "the speckled footman" by a third, or perhaps, if taken near Manchester, "the clouded drab!" If

you forced the dead languages upon them it would be worse still. I was lately visiting the stove-houses of a nobleman who has one of the best collections of exotic orchids and ferns in this country, and whose gardener is most scientific and successful in their cultivation; but the poor man was terribly put to it with the labels, and had too often joined masculine and feminine, with a more correct idea of connubial than of grammatical harmony!

The greatest difficulty will hereafter arise in the way of forming correct lists of truly British insects, from the quantity of *bought* specimens and collections, which Mr. Scott so justly decries. Kirby says, "I have seldom seen a cabinet so meagre as not to possess some unique specimen." Now, alas! if one substituted the word "bought" for "unique," it would be nearer the truth. This evil should be taken in time, and might be counteracted by every *bonâ fide* collector, who wishes that science should benefit by his labours, keeping a careful catalogue containing the history of how each scarce insect came into his possession; and properly not a single specimen bought from a dealer should be admitted without some mark being adopted to note its antecedents.

The importance and value, therefore, of "Local Lists" cannot, in this respect, be overrated. But, at the same time, there is now a well-founded and natural aversion to publishing the exact localities and stations of rare things, from the unscrupulous way in which collectors, amateur as well as professional, too often eradicate, as far as lies in their power, any rare object. What writes a friend, a prominent entomologist, to me on my telling him of the discovery of a scarce insect? "Be sure you don't say anything about the locality to any one." One of the most distinguished botanists in England, on hearing of my finding a rare plant, writes, "I trust you will be very careful not to risk the extirpation of so truly interesting a species by making its station known to any of our collecting societies or their agents, or to any collector of plants for sale." Botany is more exposed than her sister sciences to this danger; and this has been the reason why communications to the 'Phytologist' were so much less numerous than those to the 'Zoologist;' not because Botany is less studied at present in Britain than Zoology, or that there is little left to discover and record, for one's own experience and that of one's friends convinces one of the contrary, but that when one finds new stations for rare plants, or good botanical localities, one is shy of publishing them; as, the more choice the plants, the more certain it is that the ruthless hand of some "eradicator of rare plants" will visit the spot, and carry

off all he casts his unpitying and *unnatural* eye upon. The same rule applies, with some modifications, to insects. You or I, A or B, being persons of known respectability, and having won the keeper's heart by taking an interest in his young pheasants, and perchance affording him a practical hint or two on their management, are allowed to roam about and wander at will in Lord C's or Sir Harry D's woods, which are an easy walk from your house. After a due course of colds, caught by leaving your windows open at night, and of treacle and rum (not for the colds!) a "carefully compiled local list" appears in the 'Zoologist.' I may here remark, that India-rubber shoes and a dark lanthorn carry supernatural terror to the guilty consciences of night-prowlers, who, I'll venture to say, don't forget the first fright so as soon to invite a second. The story of course runs that ghosts of murdered people are to be met with o' nights in the woods, and the startling cry of the puckeridge is soon translated into the scream of a punished spirit. You thus prove no mean ally to the keepers.

Well, after acting "Jack-o'-Lanthorn" for some time, the list appears. If it be sufficiently tempting, the next spring sees the arrival of some "Mr. E" or "Mr. F," professionally retained to collect insects for the "silver-net" naturalists, and may be with a private order in his pocket from some oologist in Leadenhall Market. The historical result in the experience of the keepers is, "that there were more barren hen pheasants that year as the man went about with a green net than any other year they remember." I do not wish here to condemn the entire practice of collecting by proxy; but, as we occasionally read complaints of such and such woods and parks being forbidden to collectors, through the so-called "illiberality of landed proprietors," I wish to show that such proceedings are often not so harsh and ill-natured as they might at first sight appear to be; and I would say to such cavillers, "audi alteram partem."

A friend of mine, who was at Spa last summer, tells me he chanced to ask a *lacquais-de-place* whether there was any game in the country. The man triumphantly (as if his strong point had been unwittingly touched upon) pointed to a neighbouring hill, and said that on that very hill, that very season, a gray hen had hatched out a brood. The gentleman sighed on thinking of the different view taken of the rights of property in his own degenerate neighbourhood, and wondered how long a pheasant's nest in Hants would remain intact after becoming the talk of the parish. Here, apparently, the whole population rejoiced with their neighbour, and took a pride in his good fortune. The guide, gathering his thoughts from his *disjecta verba*, added "But M'sieu

may console himself, two chasseurs were placed to guard the nest day and night." "Sic vos non vobis, nidificatis aves." Birds in that country, even when nesting, are not left to themselves! Well, people in England, not liking the trouble of chartering a couple of policemen to guard any rare object from reckless depredation, adopt the alternative afforded them by the proverb, that "Silence is the best noise."

Now, all this is contrary to the spirit in which the study of Natural History should be followed. For what is the end and object of studying the works of Creation? Is it not to try and arrive at the knowledge of God? Our aim, then, should be, not so much to outdo our predecessors in systems and nomenclatures, as to show that these studies affect our hearts and lives: and that man will do infinitely more good to his generation, aye, and (if that be his wish) have much more claim to have his name handed down to posterity, by competing with the Isaac Waltons, the Gilbert Whites and the William Kirbys, in their Christian simplicity and kindliness of disposition, than if he were to succeed in overthrowing all the systems of Linneus, Jussieu and Cuvier.

But how is this to be done? We know that for 4000 years, "in the wisdom of God, the world by wisdom knew not God;" and yet we profess that our object is the knowledge of God: and let us not think that that world which was so unsuccessful owed its disappointment to its consisting of uncivilized barbarians, for it boasted the most cultivated and highly polished nations that have ever been known on earth —nations that have left us works of genius and of intellect as yet unrivalled in the world, and that have beaten us hollow in almost everything but the science of money-getting: and yet these men, with all their own wisdom and gifts of intellect, and with all the works of God's wisdom around them, "knew not God." Let us, then, "not be high-minded but fear."

But, again I ask, how is it to be done? I supply the answer in the words of a revered friend of mine, who, meeting me one day as I sallied forth armed *cap-à-pie* for an entomological ramble, concluded a conversation thus: "Yes, my young friend, I like to see it; for there are two books which we cannot read too much, the Word of God and the Works of God. But remember! the book you are going to read to-day will do you no good, unless you blend its teachings with those of the other; for though that one can do without this, this one *cannot* do without that." And as it was of old so it is now, it is not by wisdom, it is not by the knowledge of the external objects of nature that men come to know God, but through Jesus Christ: that

is, in other words, it is not by reasoning but by revelation, not by philosophy but by faith.

I add to this paper a list of the butterflies and moths (to the end of the Sphingidæ) which I have captured or observed during the last few years in this neighbourhood. The country I have worked has been geologically favourable, consisting of chalk, upper green sand, lower green sand and London clay. Botanically, it is perfect; the chalk offers magnificent beech woods and hangers, and downs studded with yews, junipers and furze: the clay boasts of its oak woods, which extend, almost without break, from Chichester to Southampton; and the few old primæval trees still remaining tell us that the ancient British Forest of Anderida stood hereabouts, now partly represented by the Forest of Bere: the undergrowth consists of birch, holly, blackthorn, whitethorn, buckthorn, &c.: the sand can still pride itself in an unreclaimed heath, and, where enclosed, is entomologically improved by plantations of larch and Scotch fir. If the list is still far from perfect, and does not yet boast of C. sponsa, C. promissa and T. subsequa, I plead in return that Entomology is not my profession, and what I have done and hope to do is achieved by half-hours now and then; but, if I may be allowed to contort the passage, I endeavour to have "nulla dies sine Linnæo."

List.—Butterflies.

Pieris cratægi. In and near woods, June. Not common.

„ Brassicæ, Rapæ, Napi, A. Cardamines. Common.

Leucophasia Sinapis. Not common; May and August.

Gonepteryx Rhamni. Common; double-brooded.

Colias Edusa. Common some years, along the railway from Chichester to Havant, and adjoining fields, &c.

„ „ var. Helice. I have taken three specimens of this variety.

„ Hyale. Five specimens, one in the Isle of Wight, the rest at the same place as C. Edusa.

Thecla Betulæ. In Woolmer Forest and Forest of Bere; September.

„ Quercus. Ashford, near Petersfield and Forest of Bere.

„ Rubi. Same as above.

Chrysophanus Phlæas. Common.

Polyommatus Argiolus. In the garden at Ashford, occasionally.

Polyommatus Alsus. I think I have taken it at Ashford, but am not quite certain.

„ Ægon. Local, but common.

„ Alexis. Common.

„ Adonis. I have not taken this nearer than the Isle of Wight.

„ Corydon. Same as above.

„ Agestis. Rare.

Nemeobius Lucina. Widely dispersed and abundant in woods.

Limenitis Sibylla. Ashford, Forest of Bere and Stansted Forest. In 1853 I took fifteen in a very few minutes in the Forest of Bere.

Argynnis Paphia, A. Aglaia, A. Adippe. In woods.

„ Lathonia. I have had the great good fortune to capture six specimens of this splendid insect: with two exceptions I think I have taken all that I have seen. These exceptions were, one last year in the Forest of Bere, which I observed sunning itself within a yard of me, but over-anxiety and an intervening spray of blackthorn defeated the first dash with my net, and, after a frantic chase of some minutes, a hostile bramble reduced me to something below a level in a deep ditch: the other specimen I saw the year before near the same place, but I had no net with me, and failed to catch it with my hat. The specimens I took were on the skirts of, or just inside, woods. All occurred in the latter part of June.

„ Euphrosyne and Selene. Very common in woods.

Melitæa Artemis. Marshy ground near Ashford.

„ Athalia. One specimen at Ashford.

Vanessa Cardui. Sometimes very common.

„ Atalanta, Io, Urticæ. Common.

„ Polychloros. Widely distributed in woods, and not uncommon.

„ C-album. Nursted Woods and Forest of Bere; not uncommon.

Apatura Iris. Not uncommon in woods at Ashford and Forest of Bere, but of course very difficult to capture. I took a magnificent female on the 26th of August, and the same year took another on the 14th of July.

Arge Galathea. Common.

Satyrus Semele. Common on the sea coast, eight miles from here, and in the Isle of Wight.

„ Janira, Tithonus, Megæra, Ægeria, Hyperanthus and Pamphilus. All common.

Pamphilia Linea and Sylvanus. Common.
„ Comma. I have taken a few specimens at Ashford.
Syrichthus Alveolus. Common in woods.
Thanaos Tages. Common in woods.

Sphinges.

Trochilium tipuliformis. Ashford, on vines; June.
„ formicæformis. Forest of Bere. Two specimens.
Ægeria apiformis. Willow-bed at Ashford.
„ bembiciformis. Same as before.
Sesia bombyliformis. Forest of Bere, and at Rhododendron flowers in the neighbouring gardens; June.
Macroglossa Stellatarum.
Chærocampa Elpenor.
Deilephila Euphorbiæ. On the sea coast, about eight miles from here, where Euphorbia paralias abounds, I have observed unmistakable tracks of the larvæ of the insect, but have not yet got it.
„ Galii. A brood of the larvæ were found in the flower-garden at Uppark, by Mr. Weaver, secretary there.
Sphinx Convolvuli. Abundant in 1846, when I took it just after dusk, hovering over a bed of Verbena, and also at the tall pink Phlox. I have met with it a few times since, both at Ashford and near here.
„ Ligustri. Common.
Acherontia Atropos. In potato-beds at Ashford. Atropa belladonna abounds in the woods, but I have never found the larvæ of this moth on it yet, though I have searched.
Smærinthus Tiliæ. Not uncommon; Ashford, &c.
„ ocellatus. Same as above.
„ Populi. Same as above.
Anthrocera Trifolii. Three specimens; Ashford.
„ Filipendulæ. Common.
Procris Statices. Forest of Bere.
I reserve the rest of my list for a future number.

WILLIAM HENRY HAWKER.

Horndean, Hants,
February 10, 1855.

Note on the Economy of Saturnia Pyri.—I obtained nineteen cocoons of this species, collected in the neighbourhood of Paris, in the autumn of 1829. Of sixteen cocoons remaining alive in 1830 (having given two away, and pierced a third, with a view of preserving the pupa), the first imago was hatched about the 27th of March, the cocoons having been kept all the winter in an extremely warm room, which undue degree of heat does not appear at all prejudicial to this insect; two more made their appearance between the above period and the 6th of April, all three females; leaving, as far as I can judge, but two males in the whole collection, which are not yet (April 7th) disclosed. The three now existing were perfectly developed, notwithstanding, in the first instance, the cocoons were not bound down, a precaution I adopted immediately for greater security. The females are much more active than I imagined; fluttering about during the night in their prison, to the great detriment of their wings: their flight is very easy and rapid, and they are readily attracted to a lighted candle. I have just opened the body of a dead female, but, to my surprise, could find neither eggs nor even any apparent ovaries. That this insect, in its larva state, is little sensible to cold, may be inferred from the fact, that I could obtain at the close of the most ungenial summer of 1829 no less than nineteen cocoons, and had the season been more propitious I might, probably, have procured many more.—*W. A. Bromfield. This note by the late amiable Dr. Bromfield was obligingly forwarded me for publication by Mr. Curtis.*

Are the Psychidæ to be considered Bombyces or Tineina?—This small group, small at least so far as concerns our Fauna, is at present knocking at everybody's door for a protector. Like the genus Eudorea it is bandied about, now here, now there, one refusing to place it amongst the Bombyces, another amongst the Tineina. Much weeding and transplanting has been done of late, and many of the little fellows must feel rather queer with such strange signboards put over them. It seems strange that amongst the many who have such ample means of determining and fixing the "locus" of the Psychidæ—I refer to the records of the researches of others which they possess, as well as to their own investigations—that there should still be so much division on the subject. One party asserts and insists that they are true Bombyces, and so he arranges them in his cabinet. Another prints a list in which they do not figure in that section. A third party, whether acting on this hint or being emboldened at seeing his own views shining through the cloud, pauses until it clears a little, and produces a most able Monograph, showing them to be a section of the true Tineina: many are the comparisons which he calls to his aid. Long before the appearance of Mr. Doubleday's list,—indeed until then I was not aware that any one entertained similar views to myself,—and consequently long before the publication of M. Bruand's Monograph, I often thought of their great external resemblance to some of the Tineina, from the many points which they held in common with that family, from their very earliest stages up to their final development. First, we have the larva bearing its house about with it on its back as in Talæporia, Solenobia, Diplodoma, Xysmatodoma, &c. Then we have apterous females, as in the two former of these genera. To this circumstance I do not attach so much importance, as I see no reason, because we have not hitherto met with them, why, in the yet unexplored regions of the earth, the Rhopalocera, Sphingina, Noctuina, Pyralidina, &c., should not be found having apterous females. It would only be completing the gradation, and is not drawing too largely upon the imagination to suppose this. In the males again, the contour of the

wings partake very much of those of Talæporia and the others mentioned before, and the covering of the wings also, in some of the species, being hairy rather than scaly, bind them to a portion of Lampronia and other genera. On denuding the wings and examining their neuration, we find that the affinities do not cease entirely, although we feel bound to say that we agree with M. Bruand when he states that this is a character on which not much dependence can be placed, seeing that in the same genus one species partakes of a character wanting in another. We give his own words: "Voir les nervures de fascelina et pudibunda: l'interne, qui est double chez la première, est simple chez la seconde." (Mon. Psychides, p. 125.) These we think are the most prominent points, those on which all from a little careful observation may be able to give an opinion. But we will proceed a little further, as, although the characters are not so conspicuous, yet they are equally important, consisting of the minutiæ into which many may never have enquired, and many others may not have possessed the means of examining; whilst a third class may not have thought of comparing them. These bear with them some little testimony of the views entertained by ourselves. Certain of the species of the Psychides are without a tongue, and on referring to the Tineina, Exapate, Dasystoma, Talæporia, Tinagma, &c., are found minus that organ, while in several other genera it is so short as to be scarcely discernable: the palpi also are sometimes entirely wanting, as in the case of Cemiostoma, &c., while in other genera, such as Diplodoma, Xysmatodoma, Ochsenheimeria, at least one pair is undeveloped. From the foregoing remarks it will be seen that we consider the Psychidæ nearly related to the Tineina, and that they especially resemble Talæporia, Solenobia, Diplodoma and Xysmatodoma, in external characters. The two former of these genera have apterous females; the two latter winged in both sexes. The tongue is wanting, and the maxillary palpi are in all four cases undeveloped. The larvæ are also case-bearers. And now if we shall have thus been the means of inducing others to come forward with such proofs as they have collected, either as relates to the consignment of the Psychidæ to the Bombycina, or to the Tineina, we have obtained the end which we had in view. —*John Scott; South Bank, December*, 1854.

Occurrence of Spœlotis valesiaca, S. cataleuca and Botys terrealis, near Beddgelert.—Any entomologist whose rambles may lead him into North Wales, would probably find a rich field for his labours in the neighbourhood of Beddgelert. My own experience of the locality is but limited; however, the result of a few hours' collecting about the 23rd of July last, was twenty-eight of S. cataleuca, one S. valesiaca, and a B. terrealis. S. cataleuca was flying in the middle of the day with the greatest activity, and in swarms, over a quantity of *débris* from some old copper mines, their lively habits, together with the roughness of the ground, rendered their capture somewhat difficult. Out of this same *débris* I also started a fine S. valesiaca, which was readily captured; another specimen I had chanced to detect at rest near Capel Curig a few days before. B. terrealis I took amongst some brake at the foot of Snowdon, very near Beddgelert, and perhaps at an elevation of 300 feet. The old mines lie to the left of the road from Beddgelert towards Llanberris, about two miles from the former place, and may readily be recognised from having a powder magazine and manager's house attached, both partially in ruins.—*Henry Evans; Darley Abbey, Derby, Feb.* 19, 1855.

Habit of the Larva of Glyphipteryx Haworthana.— Mr. Edleston informs me, he has been acquainted with this larva for years; it feeds in the heads of the cotton-grass (*Eriophorum*). Mr. Edleston writes, "suppose a collector wished to get them now, I

should say, go to the 'Moss' and pick up all the old cotton-grass heads off the ground, and by so doing, Mr. Haworthana would appear in due course."—*H. T. Stainton; Mountsfield, Lewisham, March* 3, 1855.

Occurrence of a Water Beetle new to the British Fauna.—It gives me great pleasure to record the capture of a Hydroporus new to our native lists,—five examples of the H. elongatulus, *Sturm* (recently determined for me by Dr. Schaum, of Berlin), having been discovered by myself on Midgeley Moor, near Halifax, during July, 1852. They were taken in company with H. Gyllenhalii and H. tristis in a small pond, or tarn, above Hebden Bridge; and, had I recognised them at the time as anything uncommon, I might, doubtless, have secured considerable quantities of them. They are darker than the ordinary continental specimens, appearing to want the diluted or piceous tinge towards the base and margins of the elytra, which is so evident in their German representatives.—*T. Vernon Wollaston; 25, Thurloe Square, Brompton, March* 6, 1855.

Note on the Orchesia minor of British Cabinets.—The Orchesia minor appearing, from its great rarity, to be but imperfectly known, not merely in this country, but throughout Europe generally, a few words concerning it may not be altogether unacceptable. It appears to have been originally described by Mr. Walker (Ent. Mag. iv. 83), in 1837, from a Scotch specimen found near Lanark; and subsequently (as Dr. Schaum, of Berlin, informs me) by Rosenhauer, from the Tyrol, under the title of O. sepicola. It seems essentially an autumnal species; coming into being about the middle of July, and lasting until September; at which time, in certain localities, I have observed it in tolerable numbers. It is particularly attached to the common sloe (*Prunus spinosa*, L.), from off the branches of which it may be occasionally beaten, especially in low, damp thickets (beneath trees), on a clayey soil. Under such circumstances I have captured it at Spridlington, near Lincoln, from July to September, not unfrequently; as also at Shenton, Leicestershire (in Ambion Wood), towards the end of October, in company with Phloiophilus Edwardsii, and other insects of post-autumnal habits. The shuffling or skipping motion, so characteristic of the genus, is carried out to such a singular extent in O. minor that, even whilst in the net, it is by no means easy to secure.—*Id.*

Note on the Tachyporus nitidicollis of Stephens.—It may be a fact worth recording, for the collectors of our native Brachelytra, that the Tachyporus nitidicollis of Stephens is a species unknown on the Continent, and one which has consequently escaped notice in Erichson's Monograph of the Staphylinidæ. For many years past I have been accustomed to capture it in several districts of Ireland, and I had always regarded it as peculiar to that country; nevertheless, Mr. Stephens' dictum of "hedges, near London" (although it is true that a single specimen only exists in his cabinet) would seem to imply that it has an English "habitat" likewise. At any rate it must be extremely rare on this side of the channel, since it has never come beneath my own observation, nor am I aware of its occurrence in any collection except the Stephensian one. In Ireland, however, it is apparently universal; and in the counties of Cork and Kerry it may be taken almost everywhere. In the vicinity of Killarney it abounds, particularly, during the autumnal months, around cultivated grounds, and in grassy spots beneath trees. In the neighbourhood of Kanturk it occasionally teems; and in the plantations of my friend, W. Leader, Esq., of Rosnalee, it is literally a nuisance. I have also met with it near Dublin; and towards the end of September, 1854, it was tolerably common in the grounds of Trinity College. I may add that I

have lately transmitted a series to Berlin, for examination by Dr. Schaum and M. Kraatz, by whom it was altogether unknown.—*Id.*

White Ant in India.—I have just received the following in a letter from a near relative, in the Horse Artillery, at Bangalore:—"Some time ago, I think in 1853, an order of Government directed all the white ants' nests within fifty or a hundred yards of the public buildings to be rooted out. In doing so, numbers of queen ants were found, and, strange to relate, in *one nest* no less than three queens were discovered, and not merely in one nest, but actually and truly in *one cell!* In several nests two queens were found. These are curious facts, are they not? Let me know if this has been discovered before. In my opinion there must be two kinds of queen, as at Secunderabad I made a coloured sketch of one from nature, and made another officer compare the sketch with the insect: well, on coming down here to Bangalore, and showing the sketch to a naturalist, he said I had evidently made a mistake in copying it, as he had never seen a queen like it, and assured me they were not of the same kind at this place, as he had seen numbers of queens when they were dug up by reason of the same Government order. I will, however, (D. V.) manage to get one and compare it with my sketch, which I know is correct. I watched the one from which my sketch was taken for hours, and highly amused was I in so doing. I had unfortunately at that time no large magnifying-glass, but could see with the naked eye that there were four or five different kinds of small ants performing their relative duties around their queen; one kind apparently cleaning her; a second polishing the shields on her back; a third evidently carrying away the dirt or dust swept off her; a fourth kind, with very strong mandibles, superintending and *certainly* correcting the lazy ones; still, a fifth kind carrying away the eggs. All the time I could plainly distinguish a drumming noise proceeding from the bunch of them, accompanied by the champing of the mandibles I spoke of (even of a night in your room where the ants are working you can hear the latter very plainly); I watched and watched, until the queen (literally a great piece of moving fat) actually made me sick. She is, without exception, the nastiest looking creature I ever beheld. As soon as I have obtained a Bangalore queen (if there is any difference between the two) I will send you the coloured sketches. I have never yet seen a proper sketch of a queen white ant; the woodcuts seen in books are absurd, and no more like the original than the moon is like cream-cheese. I know (as I told you before) my sketch is right, as several of us compared it closely with the original."—*J. M. Jones; 3, Garden Court, Temple, March* 6, 1855.

Memorandum on the Habits of the Jack Snipe.

By the Rev. J. C. Atkinson, M.A.

The jack snipe, says Mr. Yarrell (vol. ii. p. 612) "when not searching for food chooses sheltered situations among strong rushes or coarse long grass, and the luxuriant vegetation common to moist grounds. In such places it is remarkable for its sluggishness, seldom taking wing till almost trodden upon, which has induced French naturalists to call this species Bécassine Sourde, as though it were deaf to the

approach of an enemy, and instances have occurred in which a jack snipe has allowed itself to be picked up by hand before the nose of a pointer." . . . . " It does not, when flushed, utter any note."

In the month of March, last year, I fell in with five or six jack snipes in a piece of boggy ground on the moors here, and on one of these I very nearly trod as I stepped across a sort of water channel. This bird, on being so very rudely flushed, did utter a note,—the one solitary instance in which I have ever heard the note of the jack snipe: it was a little, faint, stridulous *pipe*, and more resembling the cry of the common bat than that of any bird I ever listened to.

In reference to the other peculiarity in the habits of the jack snipe described in the above quotation, I may mention, that as I was walking a few weeks since with my gun, I wounded and followed a partridge. While searching for it I walked up a hedge, by the side of which a little stream of a few inches in width trickled along. An object in this stream caught my eye sufficiently to arrest my attention; a second look showed me it was a jack snipe lying perfectly motionless on its breast, and with head stretched out, on the surface of the water, which was streaked and spotted with a few blades and leaves of water-grass and other aquatic plants. That it was not dead was apparent from the fresh unruffled appearance of the plumage; that it was simulating death was equally apparent. I stood within two paces of it, watching it for a minute or two; it remained unmoved; I advanced a step nearer, still it did not stir; I stooped, put out my hand, and then, but not until my fingers were within a foot and a half or so of it, did the little fellow show that it was only feigning all this time, for quickly and briskly enough it rose and flew away.

Now, I do not hold that this jack snipe showed itself either " sluggish" or " sourde" by the conduct I have detailed; on the contrary I think, that in virtue of that instinct which, in such a vast number of the animals we know most familiarly, looks so marvellously like something higher than what we commonly understand by instinct, it did what was best and most appropriate under the circumstances and in connexion with the object in view. Every wild creature, with an exception or two, when disturbed by man, or indeed any other of its enemies, seeks refuge in one of two ways—by flight or by concealment; and as far as my own observation goes, I believe that the latter way is the one which the creature by its first natural impulse is led to attempt, and is in fact the one much the most frequently attempted when at all practicable, except under abnormal conditions. Why does the hare on the stubble or fallow, as you go by her within a few

yards, only crouch down the closer in its seat? Why does the waterhen, as you walk along the stream, make for the overhanging bush, often on foot,—if by flight, only by a short one,—and there emerge itself? Why does the partridge, after lifting its head for a moment to survey the approaching intruder, cower close to the ground, if at all rough of surface, or crouchingly run to the nearest available covert of stubble or weed or bush? Why does the common snipe, as you draw near to its haunt, leave the ground it was feeding on, and hastily run off to the sheltering rushes.* I say, because instinct teaches them to employ those habits which Nature has given them for such purpose in seeking safety by means of concealment, and because, moreover—shall we again say?—*instinct* points out to them the way of concealment under the circumstances of place and possible shelter, the most easily attained and likely to be effectual. Alter the circumstances, and you alter too the conduct of all these creatures. The little-disturbed covey of partridges that yesterday hid themselves till you were within twenty or twenty-five yards of them, to day, when snow covers the ground, flies hastily off as soon as you come in sight. The hare leaves the open field and goes to the hedge, and, unless that hedge be very thick, very likely steals away on the other side long before you come abreast of it. The snipe, if not already driven from its haunt of yesterday, rises wild, and betakes itself to some open spring, or else some close concealment. But why? Because their "instinct" teaches them that concealment is, under the circumstances, impossible: nor do I think the increasing wildness of the game birds as the season advances weakens the argument. It does not take long to teach birds, the dwellers in islands hitherto untrodden by man, to avoid their first human visitor as an enemy and destroyer; and depend upon it, the sound of the gun is soon recognised and understood by the grouse and the partridge; and besides, the birds that have tried their powers of flight once and again when alarmed or disturbed soon learn to place confidence in that resource.

No doubt some creatures resort to concealment much more than others. The water rail and land rail both must be surprised to be made

* All these facts I have verified by personal observation within a few weeks past. Twenty times have I seen, since the snow first set in, the waterhen retreating to concealment as I approached, or the tracks of its having done so within a few minutes past. Twice I have observed the snipe acting as mentioned in the text; while, with respect to the partridge and hare, every person the least conversant with their habits will at once recognise the truthfulness of the reference I have made to a part of those habits.

to fly at all, and rarely, if ever, can be flushed a second time. The jack snipe and woodcock (and often the common snipe) "lie" remarkably "close." The coot and the waterhen can scarcely ever be driven from the sedges and reeds, and so on; but still, allowing for variation in habits, I think observation shows that wild creatures generally, when they are able, through a combination of natural powers and favourable circumstances, try in the first instance to avoid what may be approaching danger by avoiding discovery; if this attempt appears likely to be in vain, then by flight.

Now I think that the jack snipe I have mentioned was influenced to act as it did by this instinct. There were no "strong rushes," or "coarse long grass," or "luxuriant vegetation," anywhere near it: concealment by such means was out of the question; but *quasi*-concealment by means of utter stillness and simulated death—a means resorted to, observe, by many another creature besides the jack snipe, and not imputed to them as sluggishness, or stupidity, or intellectual deafness—is practicable, and therefore adopted; and, indeed, the little bird might well have gone unnoticed by nine passers-by out of ten, although of much quicker sight than myself.

I know that man is "fearfully and wonderfully made," and I believe that the inferior orders of animate creation are, at the least, "wonderfully" made, and it is with feelings of distaste that I hear whole species of them vilipended as to their—what in our own case we should call—common sense. It seems to me like throwing a slur on Creating Wisdom. I believe that the foolish guillemot and the dotterel are as sufficiently furnished with the common sense requisite in their own scale of creation as the race of mankind is in theirs, while I am sure that the "silly goose," the "obstinate pig," and the "stubborn" and "stupid jackass," very frequently are better stocked with the article in question than many of those who apply these epithets to them; nay, even the booby and the noddy might not be found so very "deficient" after all, if only we knew them, *and they knew man*, more intimately. For my own part, I have the most entire conviction that the more closely we observe the ways and habits of animal creation, the more thoroughly and intimately we become acquainted with the laws of their being, the more searchingly we trace and investigate the characters legibly—and to the true inquirer not unintelligibly—impressed upon them by the Author of their existence, the more, even among the most contemned and despised races, shall we find to admire, to wonder at, and reverently

to pronounce compatible only with the possession by their Maker of nothing short of Infinite Wisdom, Infinite Power, and Infinite Goodness.

J. C. Atkinson.

Danby, Grosmont, York.

Occurrence of Wild Fowl at Scarborough.—We have had abundance of wild fowl on our coast this severe weather. I here send you a list of birds brought in from February 1st to the present time, to be preserved:—Brent geese, three; smews, four; common scoters, three; velvet scoters, three; goldeneyes, fifteen; scaup ducks, sixteen; mergansers, two; rednecked grebes, five; eared grebe, one; blackthroated diver, one: all in fine adult plumage.—*Alfred Roberts; King Street, Scarborough, February* 27, 1855.

Winter Visitors to the Norfolk Coast during the late severe weather.—The unusual severity of the weather during the last two months naturally put collectors on the *qui vive* for good birds; but although our coast is generally noted for the occurrence of rarities, the present season seems chiefly remarkable for the numbers of scarce species, usually appearing in small quantities. Most of the common kinds of wild fowl and hoopers have visited us in very large flocks; the goldeneye and scaup ducks peculiarly numerous: at the same time there has been an almost total absence of some species looked for in sharp weather, such as the pintail and long-tailed ducks; and, in another class, the Bohemian waxwing has not, I believe, occurred in the county. The following is a list of such birds as have come under my notice:—

Snow buntings and bramblings. Large flocks of these birds have been met with. A bird-stuffer in this city has now eight of the former alive and doing well in confinement.

Hawfinches. Several of these birds have been shot lately.

Lesser Spotted Woodpecker (females). Rare.

Rock Pipit. Killed at Yarmouth.

Hoopers. More than twenty of these swans have been killed to my knowledge.

Bewick's Swan. Two shot at Yarmouth, one at Hickling, and two at Bowthorpe, near Norwich.

Whitefronted, Bernicle, Brent and Bean Geese.

Pinkfooted Goose. One specimen from Holkham.

Sheldrakes. Five adult birds.

Velvet Scoters. One old male and two females

Common Scoters. Extremely numerous.

Goosanders. Out of thirteen specimens, six adult males; very fine.

Red-breasted Merganser. Three old males, in full winter plumage.

Common Cormorants. Two.

Green Shag. One.

Blackthroated Diver. Young male.

Redthroated Diver. Six or seven, all immature.—*H. Stevenson; Norwich, March* 19, 1855.

Occurrence of the Polish Swan at Hornsey Mere.—On the 2nd of March two fine adult specimens of the Polish swan were killed on Hornsey Mere (near Yarmouth), by Mr. Rising's keeper: they were quite alone, and difficult to approach. One of the specimens was sent to Mr. Yarrell for his inspection, who confirmed me in my opinion, as to its being the "Cygnus immutabilis" (changeless swan) of his work. Several flocks of this wild swan were seen in the neighbourhood during the late severe weather, and within the last ten days three more birds have been obtained in the same locality as the above; one of which proved to be Bewick's, and the other two hoopers.—*George S. Frederick;* 13, *Westbourne Terrace, North, March* 19, 1855.

Black Swans Breeding in Confinement.—A pair of black swans which have been in my possession for about three years, without having bred, have just hatched three cygnets, from four eggs. They were very busy quite early in January in making their nest, which consisted of rushes, which they collected themselves on the banks of the canal; and of which they collected a large quantity, and which they were continually adding to the nest during the time they were sitting. They have chosen a spot entirely exposed to the north wind without the slightest shelter, and at times I feared they would have been buried in the snow. The first egg was laid about the 15th of January, and the young ones were hatched on the 8th of March: they are quite strong, and there seems every chance of their living.—*Samuel Gurney, Jun.; Carshalton, March*, 1855.

Curious act of Autosurgery in a Teal.—On the 27th of February my brother wrote to me from Conway, North Wales, and he says, "I shot a teal some days ago which had had its leg broken some days previously, probably by a shot. This bird had most ingeniously spliced and mended it. Through a hole in the skin the bird had passed tolerably large feathers, had passed them round the protruding bone and back again through the hole, thereby keeping the bone not only covered, but pretty close to the fracture; several feathers were thus employed, and all fastened off and glued together by means of the clotted blood, so that a casual observer would not have remarked it. I thought it uncommonly ingenious, and, in my desire to ascertain the *modus operandi*, I pulled all the feathers ont, or I should otherwise have preserved it." I wrote to my brother to know whether he was certain it was not done by some other means, as for instance, by the shot. To my inquiries he replies: "The teal's leg was broken in the length where there are *no feathers*, and the principal feather inserted by the bird was not such a feather as grows on the upper portion of the leg, but appeared to me to be a long breast-feather or wing-feather near the breast. The manner in which it was inserted, leaves no doubt in my mind that it was so placed by the bird, as were the other feathers which I have described."—*T. A. Preston; Emmanuel College, Cambridge, March* 13, 1855.

Electric Property in the Feathers of a Woodpigeon.—"On Thursday, the day before the thaw commenced, I shot a woodpigeon, which I put into my pocket; on taking it out when I got home, a good many feathers which were loose, were so attracted to my body and clothes that it was a work of labour to remove them all; and when I held one of the feathers in my hand and put my finger or anybody else's finger near the feather, it was attracted to it. Now, I am aware that this is caused by the electricity of my body, but as no other feather was thus attracted except taken from the body of the lately-killed pigeon, I should like an explanation of this." In answer to questions put by me, my brother says: "The pigeon had been shot fully an hour before I got home. It was very severe frost, probably the feathers had retained

a good deal of their natural heat, from being carried in my pocket: I fancy the state of the atmosphere had a good deal to do with it. The feathers of the bird next day showed no signs of electricity." Are feathers in general so electrified? or does this happen in certain states of the weather? If you would kindly furnish me with any information on these points, you would much oblige.—*Id.*

Some Observations on the Salmo Estuarius or Estuary Trout.

By R. Knox, M.D., F.R.S.E., &c.

Many esteemed naturalists still view certain members of the natural family of the Salmonidæ as mere varieties, dependent for their origin and permanency on the influence of the surrounding media in which they have been accidentally placed. In respect of some of these so-called varieties such a view is probably the correct one; but having for many years adopted other views as to the origin of species, the relations of species to natural subfamilies, and of these again to natural families or genera, and having lately tested these views by an appeal to the principles of transcendental anatomy, I continue to view as distinct species many races or kinds of animals which others look on as mere varieties.

Amongst these I place a race or kind of trout which I have ventured to call the estuary trout (*Salmo Estuarius*), simply because I have hitherto found it to frequent chiefly those waters "into which the tide ebbs and flows," waters very difficult to define, a fact which many proprietors of salmon rivers have learned to their cost. The term "estuary" will not, I hope, be objected to on the ground that there are many rivers which have no estuary, and in which this species of trout may notwithstanding be found, my meaning being merely this—that the trout in question inhabits those waters, and those waters only, influenced by the tide; the brackish waters, in fact, of rivers whose limits neither naturalists nor engineers, lawyers nor chemists have been able rigorously to define.

The trout I am now to describe is a fine and delicate fish, with all the beauty of the class or natural family to which it belongs. It inhabits the brackish waters or estuary, and I have never found it higher up in the rivers towards their sources, and only twice in the sea. Those I have examined, and they have been very numerous, were mostly taken with the net near the mouth of the Tyne of East Lothian, in North Britain, and in the Nith of Dumfriesshire (also in Scotland),

between the bridge and the Solway Frith, into which the Nith pours its waters. They have been taken also in the estuary of the Forth, and, as I have been assured, in the brackish waters of the Esk, in Eskdale, Yorkshire. They were generally about a foot in length, although I have seen taken, and examined one which weighed four pounds, a weight which no doubt the greater number would reach but for the constant net-fishing which prevails in these waters. That the young of these trout were also in the net at the time the larger were captured is extremely probable, as some of the nets took everything down to the minnow and herring fry; but the young of all the Salmonidæ bearing a close resemblance to each other did not then receive from me all the attention the subject merits. Agreeing so far with my distinguished friend M. Valenciennes, that naturalists have to do only with the adult individual of any species, yet, as an anatomist interested in the advance of Philosophic Zoology, I feel bound now to say that neither the anatomy nor natural history of the grown individual will ever enable the naturalist (whatever may be his genius or learning) to place Zoology on that basis which alone entitles it to the name of a Science.

As regards its food it seems to me, after numerous examinations, to live almost exclusively, during the summer at least, on a small shrimp (*Gammarus*), which floats in innumerable shoals in these waters: these shoals or groups assume the form of a cone, the apex being upwards towards the stream, and generally close to some bank or abutment projecting into the main stream of the river. With these small shrimps I have always found the stomachs of the estuary trout gorged, and conclude that it must be the food they prefer: a draught of the net, in the Nith, took several other species of the Salmonidæ, and thus a comparison could be and was instituted on the spot: in the true salmon no food was found but the remains of the eggs of the Echinodermata; in the sea trout or Salmo fario this food was also found, but occasionally the sand eel and small herring; the same remark applies to the hirling: the small common river trout and the par, which were also taken in the net at the same time, had been feeding abundantly on flies, screws, cad bait, and all the ordinary food of the common river trout which anglers know so well; the estuary trout alone had been preying on the shrimps or Gammari, and nothing else.

As food for man these trout are excellent; their flesh is of a pink colour, and quite equal to the fine river trout of England. I fancied them equal in this respect to the celebrated Loch Leven trout, but this is a matter of taste, which I mean not to insist on.

And now, in respect of their distinguishing or specific characters, external and internal: they are a red-spotted trout, both above and below the lateral line; their head and fins are proportionally more delicate than those of the common red-spotted trout of the Scottish rivers and brooks; their proportions are, in fact, somewhat intermediate between the delicate lacustrine trout (*Salmo Levensis*) and the common riverine species, neither do I believe them transmutable or convertible into any other species of trout by any natural changes now in operation. What forms they might assume if compelled to live wholly in the sea, or in waters (whether lacustrine or riverine) wholly fresh, is a question I shall not discuss here; my own opinion is that they would become extinct.

The place it is entitled to in the scale of the natural family of the Salmonidæ I shall consider presently. The teeth are nearly as large again as in the common river trout, and the dentition is as follows:—

Upper jaw.—Supermaxillary	. . . . .	25 + 25	= 50
Intermaxillary	. . . . .	10 + 10	= 20
Palatine	. . . . .	14 + 14	= 28
Vomerine as usual in a double alternating row	. . . . .		20
Lower jaw or mandible	. . . . .	20 + 20	= 40
Lingual	. . . . .	6 + 6	= 12

These teeth are reckoned, not from the actual number of teeth present, which varies of course at almost every instant in the life of the fish, but from the number of distinct mucous cavities fitted for the reception of the teeth, whose number determines rigorously that of the teeth which are present or which are in process of development, and which disappear when, by age or maturity, a bone is about to become edentulous.

The vomerine teeth, the peculiar characteristic of the Salmonidæ, and to the arrangement and development of which M. Valenciennes attaches so much importance, do not differ in any remarkable way from others of the trout species. The anterior transverse vomerine teeth are not more distinct than they are in the common and Leven trout; that is, they do not extend beyond the mesial line, as in the common or true salmon. Having neglected to note with sufficient care the dentition of the large or full-grown estuary trout, those of 4 lbs. for example, I am unable to say what changes take place in the vomerine teeth. The law of *edentulation* (loss of teeth), as regards

the vomerine teeth in the Salmonidæ, I have ascertained to be thus: when young, all the species of the three subfamilies, into which the Salmonidæ may, for the convenience of description, be subdivided, have the same dentition, which, as regards the vomerine teeth, consists in a double alternating row of teeth, with a few transverse teeth in front upon the fore part of the vomer.* As the fish grows the great generic character and law yields to the law of specialization and of family. Thus, as regards the Salmonidæ, if the young fish is to grow into a true salmon, it loses the vomerine teeth from behind forwards, the transverse teeth in front being those which remain to the last. This, in fact, is the special character of the dentition of the true salmon. and the law which regulates it. If, on the other hand, the young fish is to become a sea trout or Fario (a subfamily strongly allied to the true salmon by some species, and as strongly no doubt with true trout on the other), it also loses the vomerine teeth from behind forwards, but retains a few occasionally in a single row, the transverse or front vomerine remaining as in the salmon; but if the young fish is to grow up a trout, then the transverse teeth, always few in number, either remain as they were or are lost, the double alternating row continues, and the bone becomes edentulous from before backwards. Which form prevails in the estuary trout I know not; I should think the latter; but, be this as it may, the estuary trout seems to me to fill up that link in the grand serial chain of the Salmonidæ, connecting the river trout with a fish of the salmon kind which appears in the markets occasionally in September,—a fish not yet well described nor placed; the red or purple-spotted salmon.

In thus describing the characteristic dentition of the three subfamilies of the Salmonidæ at present known to zoologists, I do not pretend that such distinct lines of demarcation absolutely exist in nature. To us they seem real, and so far are real, because we know no better; but, in the great scale of Nature, there are in reality no such things as species or subfamilies, all gaps being no doubt filled up, did we but know sufficiently the fossil and the recent zoologies. Generic distinctions seem alone to exist and to be recognised in Nature's scheme, and some distinguished anatomists are disposed to doubt even this. In the mean time, for the sake of classification and in the interests of science, these characters of subfamily and species answer well enough.

In August the milt in some specimens was found to be largely

* Chevron of French naturalists.

developed. The vertebræ are 60; there are 32 floating ribs on either side, and the pancreatic cœca, or rather cæcal apertures, were 36; but, if my notes do not mislead me (and they are not very distinct, having been made more than thirty years ago), I find that the number varied, a circumstance I am disposed to attribute to some error in observation.

The insect which the salmon and sea trout bring with them from the sea is also found to infest the estuary trout. The skeleton tissue is not so dense as in the common and Leven trout: it may induce zoologists and others interested in Natural History to examine the tables of proportions and measurements which I here annex, if I briefly state my own views on the relation of species to natural family or genus, based partly on these tables, but chiefly on the transcendental in anatomy.

The young of every large natural family, by the law of unity, greatly resemble each other: this extends to all the species, externally and internally. As the young grow the characteristics of subfamily and species predominate over the generic, or rather, many of the latter disappear, leaving some which by their presence mark the species and subfamily. If we apply this to the natural family of the Salmonidæ, a member of which I now describe, we shall find the view, though transcendental and abstract, fully supported by an appeal to the material manifestations of forms, and fully supporting these propositions: 1st, the specific characters of all the species of any natural family are included in the young of every species of that family; 2nd, the development of any species depends on its position in time and space, and not on the transmutation of one species into another; 3rd, were all the species of any natural family destroyed saving one, from that one all the other species belonging to the same natural family might be developed, this being merely a question of time, locality, and geological influences.

Thus no species grows out of another; all are foreseen in the natural family or genus, as proved by Embryology and by the Transcendental. The following sketch of the natural arrangement of the Salmonidæ, extremely imperfect no doubt, is subjoined merely to explain the view.

Salmonidæ.—A Natural Family.

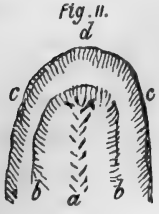
Generic characters, as exemplified in the young of any of the species: 1st, by the dentition; 2nd, by the system of coloration—

i. e. by 1, red spots; 2, dark spots; 3, par markings; 4, silvery scales.

Subfamilies.—Adult.

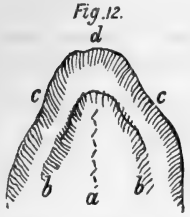
* 1. Trout.

Fig. 11.



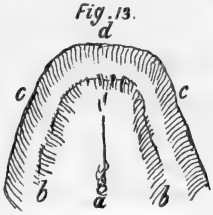
2. Sea Trout.

Fig. 12.



3. Salmon.

Fig. 13.



Colouring.

Red spots or dark spots, as the case may be. The red-spotted prevail in rivers; one species frequents the estuary: the dark-spotted trout are lacustrine generally.

Many dark spots above and below the lateral line. By so much as the fish is silvery and scaly and with few spots, by so much does he approach the pure salmon, and in health he loses all the red spots.

Silvery scales; a few dark spots above the lateral line. When the dark spots below the lateral line amount to five or six, the salesman knows that the fish is coarse, and that it approaches the Fario in character. The specific character, then, of the very fine salmon is to lose all the spots of every kind.

Lastly, for I am unwilling to extend this memoir further, species no doubt exist or have existed approximating all these species and subfamilies, leaving no gap or deficient link in the serial unity of the family; and these species will be found to be characterised, not by any new feature, not by any character wanting in the young, but the predominance of one to the exclusion and extinction of the others. The embryo, the young, is perfect generically; the adult specifically. This is the law of species, and this is no doubt the law by which Nature provides for the extinction of certain species and the appearance of others in time and space. Were our observations

* Fig. 11. *a*, marks the vomerine teeth in the trout and in the *young of all* the the species of the Salmonidæ. Fig. 12. *a*, vomerine teeth in the sea trout: the young salmon from 2½ to 3 lbs. weight has the dentition of the sea trout. Fig. 13. *a*, vomerine teeth in the full-grown salmon: the transverse vomerine teeth remain; the mesial and posterior are reduced to one or two.

sufficiently delicate I have no doubt that the principal species composing any natural family might be determined *à priori* by an inspection of the embryo and young: then and then only can Zoology be esteemed a Science.

Observations made on the proportions which the various segments of animals bear to each other, and to the corresponding structures in other animals, bear me fully out in these views.

In the fish, what may popularly be called the head includes the organs of prehension, the teeth—and of respiration, the gills. Its size, compared with the other segments of the fish, and with the same structure in other species of the same family and subfamily, will always furnish valuable information as to the character of the fish and its generic relations. The same remark applies to the fins generally; but to each after its own manner, seeing that all the fins do not belong to one system. In the table which follows are given the various measurements of three distinct species of trout.

TABLE I.

	Salmo estuarius.	S. Levensis.	S. Salar of the Tweed.
	in.	in.	in.
Total length	12⅝	12½	12¼
Length of head, measuring from snout to posterior margin of gill cover	2½	2⅝	3⅛
Utmost gape		1¼	1½
From snout to eye	⅝	¾	1
From snout to pectoral fin	2½	2½	3
Length of pectoral fin	1¾	1⅞	1⅞
From snout to dorsal fin	5⅛	4¾	5½
From snout to mort fin	9½	9	9
From snout to pelvic fin	5⅞	5¾	6⅛
From snout to anal fin	8½	8¼	8¼
Breadth of tail	4	3⅜	2¾
From snout to end of maxillary bone	1⅛	1¼	1¾
Greatest depth (immediately anterior to the dorsal fin)	2⅞ (or ⅓th of the whole length).		
Smallest (anterior to the setting on of the tail)	1		

TABLE II.—*Showing the various measurements of five Estuary Trout of different lengths: they were all taken from the tideway of the Tyne, East Lothian, Scotland.*

VARIOUS MEASUREMENTS.					
From snout to centre of tail	14 5/8 inches.	13 inches.	13 5/8 inches.	12 1/2 inches.	11 7/8 inches.
„ to tip	14 7/8 „	13 1/2 „	14 „	12 7/8 „	12 1/4 „
„ to suboperculum	3 1/8 „	2 1/2 „	2 3/4 „	2 5/8 „	2 3/8 „
„ to anterior margin of eye	1 „	7/8 „	3/4 „	3/4 „	3/4 „
„ to end of maxillary	1 5/8 „	1 1/2 „	1 3/8 „	1 3/8 „	1 1/8 „
„ to dorsal	6 „	5 3/8 „	5 7/8 „	5 1/4 „	4 7/8 „
„ to ventral pelvis	7 1/4 „	6 1/2 „	6 1/2 „	6 1/4 „	5 3/4 „
„ to anal	9 7/8 „	8 5/8 „	9 „	8 5/8 „	8 „
Greatest depth anterior to dorsal	3 „	2 3/4 „	2 7/8 „	2 5/8 „	2 5/8 „
Least depth anterior to tail	1 1/4 „	1 1/8 „	1 3/8 „	1 „	1 „
Radii branchiostegii	11 „	11 + 11 = 22	11 + 11 = 22		11 „
Fins.—Thoracic fin, length of	2 1/8 „	1 3/4 inch.	1 7/8 inch.		1 5/8 „
„ number of rays	3 + 11 = 14	3 + 11 = 14	2 + 12 = 14		3 + 11 = 14
Pelvic, length of	1 5/8 inch.	1 3/8 inch.			1 3/8 inch.
„ number of rays	3 + 8 = 11	3 + 8 = 11	3 + 8 = 11		3 + 8 = 11
Anal, base of	1 1/8 inch.	1 1/8 inch.	1 1/8 inch.		7/8 inch.
„ longest ray	1 1/2 „	1 1/2 „	1 1/2 „		1 1/4 „
„ number	3 + 9 = 12	3 + 9 = 12	3 + 9 = 12		3 + 8 = 11
Dorsal, base of	1 1/2 inch.	1 3/8 inch.	1 3/8 inch.		1 1/4 inch.
„ longest ray	1 3/4 „	1 5/8 „	1 5/8 „		1 3/8 „
„ number	3 + 10 = 13	3 + 10 = 13	3 + 10 = 13		3 + 11 = 14
Caudal, tip to tip	2 3/4 inches.	2 5/8 inches.	2 3/4 inches.	2 1/4 „	2 1/2 inches.
„ depth of fork	1/4 „	1/2 „	3/8 „		3/8 „
„ number of rays (each lobe)	6 + 8 = 14	6 + 8 = 14	6 + 8 = 14		6 + 8 = 14
Dorsal, lateral line below	1 3/8 inch.	1 3/8 inch.	1 1/2 inch.		1 1/4 inch.
„ number of scales between	26				
Teeth.—Intermaxillary	9 + 9 = 18	As in No. 1.	9 + 9 = 18	As in No. 3.	8 + 8 = 16
Vomerine	18	„	18	„	21
Upper maxillary	23 + 23 = 46	„	26 + 26 = 52	„	24 + 24 = 48
Palatal	12 + 12 = 24	„	16 + 16 = 32	„	12 + 12 = 24
Lower maxillary	20 + 20 = 40	„	21 + 21 = 42	„	18 + 18 = 36
Lingual	5 + 5 = 10	„	5 + 5 = 10	„	5 + 5 = 10
Vertebræ, number of	60	60	60	60	60
Cœcal apertures	60	60	36	36	45
Length of longest cœcum	1 1/8 inch.		2 1/4 inches.	1 1/8 inch.	1 5/8 inch.

The late Mr. W. Murray, of Henderland, whom I had the pleasure to call for many years my friend, informed me that occasionally a trout much resembling the species I have described was taken in the trawl-nets in Loch Fine; and this observation was confirmed by my brother, who, being engaged on the 17th January 1838, in inquiring into the herring fisheries of the Western Lochs, was present when two trout were taken in the trawl-net, off Collambray Ferry, in the Kyles of Bute. The following description of these trout I subjoin from my brother's notes: I examined them also; they seemed to me to differ somewhat from the estuary trout, but as observations respecting red-spotted trout caught in the sea are so rare, I shall not venture to offer any more decided opinion.

No. 1.—*Trout taken with two others in a trawl-net off Collambray Ferry, Kyles of Bute, on the Bute shore, January* 17, 1838: *that is to say, in the sea.*

Snout to centre of tail	13 inches.
„ to dorsal fin	$5\frac{3}{8}$ „
„ to pelvis fin	$6\frac{1}{4}$ „
„ to anal fin	$8\frac{3}{4}$ „
„ to extreme margin of gill-cover	3 „
Length of head (dorsal line)	2 „
Greatest depth	$2\frac{3}{4}$ „
Weight	13 oz.

"Milt not larger than a crow-quill, soft, but had evidently performed its function; when cut into, red (like the Loch Leven trout); food various, and in large quantity; pancreatic portion of intestine contained a large tape-worm and several small hard worms, &c.; spleen was triangular, not more than $\frac{5}{8}$ths each way; liver healthy; no fatty deposit whatever in the interior.

"This trout, when first taken from the Loch, looked exactly like a river trout in very fine condition; the abdomen and fins were of a rich yellow colour. With the exception of the spots being about half the size and greatly more numerous, the general colouring of both trout was the same. As an article of food it was delicate, and resembled closely the red trout got in Loch Leven, the Tyne at East Linton, and that from the estuary of the Nith at Dumfries."

No. 2.—*Trout taken with two others in a trawl-net off Collambray Ferry, Kyles of Bute, on the Bute shore, January* 17, 1838.

Snout to centre of tail	13¼ inches.
„ to dorsal fin	5¼ „
„ to pelvis fin	6 „
„ to anal fin	8½ „
„ to extreme margin of gill-cover	2¾ „
Length of head (dorsal line)	2 „
Greatest depth	2¾ „
Weight	13 oz. 4 drs.

"Sex, female.—Ovary small, whole mass about 1½ inch in length. The fish may have spawned, in all probability, last September or October early: muscle, when cut into, a bright and clear vermilion colour, like salmon.

"This trout in colour and marking was very like the preceding one; the form, however, of the body generally greatly differed. I have preserved the skin and taken a cast, which will show the difference in form, the comparative smallness of the head, and greater depth of body. The skin shows the spots on the integuments greatly larger than in No. 1, and fewer in number. This fish, as an article of food, was decidedly superior to the preceding, and I think, generally speaking, that the female trout is superior in this respect to the male, both being at the time in good condition. I am of opinion that Nos. 1 and 2 were male and female of the same species of trout, and in all probability of the same age. I have taken a plaster cast of the stomach, viscera, &c.; the contents of the stomach consisted entirely of a clear pale orange-red, shrimp-looking insect, something like those got in the stomach of the other trout, and preserved; but in this, the female trout's stomach, they seemed to be of finer quality. From the pancreatic cœca I drew out three tape-worms, similar to those found in the male trout: these worms were each about 6 inches in length."

To sum up the specific characters of the estuary trout, I would say, that, in general colouring, it resembles the common river trout, with bright metallic tints; scales minute, adherent; head and jaws proportionally smaller than in the common river trout; muscles pink-coloured, sometimes bright red; numerous red spots above and below the lateral line; lives in brackish waters, but is sometimes found at sea; food, small shrimps.

Radii branchiostegii			22
Rays of the pectoral fins			14
„ pelvis or ventral	1 + 9	=	10
„ anal	3 + 9	=	12
„ dorsal	3 + 11	=	14
„ caudal—each lobe	6 + 8 = 14 + 14	=	28
			100

Teeth—Intermaxillary	10 + 10	=	20
Vomerine			20
Upper maxillary	25 + 25	=	50
Palatal	14 + 14	=	28
Total, upper jaw			118
Mandibular or lower jaw	20 + 20	=	40
Lingual	6 + 6	=	12
			52
General total			170

My esteemed friend and former student Mr. George Hunter, of Tynefield, and who I recollect was a first-rate angler, said that he believed he had occasionally caught these trout with a very small artificial fly and single hair tackle, from off the bank of his father's property, which skirted the estuary of the Tyne. I do not doubt this, for all the species of the Salmonidæ will occasionally rise to a fly, although it is the natural food of only some of them.

In conclusion: throughout the preceding inquiry into the natural history of the estuary trout I have used the *dentar formula* so strongly recommended by my esteemed friend M. Valenciennes, as being the one I think generally received; but I think it right to state here, that extended inquiries I have of late years made on this point have satisfied me that the view adopted by this eminent naturalist is neither practical nor scientific. The true salmon and the salmon trout, when weighing between $2\frac{1}{2}$ and 3 lbs., have precisely the same arrangement of the vomerine teeth, and cannot therefore be distinguished from each other *by this character* alone. On the other hand, as the Fario or sea trout grows larger it loses the posterior vomerine teeth just as much as does the true salmon, and thus the dentition again ceases to be a distinguishing characteristic. The young of both Salmo and Fario have the dentition of the common trout. Thus, the law of dentition applied by M. Valen-

ciennes to the three subfamilies of the Salmonidæ is a partial law, applicable probably to some Continental species, but inapplicable to the great family of the Salmonidæ as they now exist in the waters of the globe. Now, the Philosophy of Zoology, based on the Transcendental in Anatomy and Physiology, requires higher generalizations than those used by and of use to the merely practical man. A wide inquiry into the dentition of serpents taught me this fact many years ago.

R. Knox.

Miessen House, Upper Clapton.

Memorandum of the Tadpole Fish.—I have lately observed among the sprats brought to Billingsgate Market an occasional specimen of the tadpole fish (*Raniceps trifurcatus*). My attention was called to the subject by my son, a boy of eight, bringing me one which he had picked out from among a parcel of sprats, and this inducing me to look more carefully at the sprats exposed for sale, I am led to the conclusion that this odd-looking fish is not so excessively rare as is generally supposed; and I wish particularly to direct the attention of ichthyologists to its occasional occurrence amongst sprats. The extreme length of a specimen which I minutely examined was $5\frac{1}{8}$ inches, and its circumference close behind the insertion of the pectoral fin $4\frac{1}{4}$ inches; the length of the head to gill-opening as 1 to $3\frac{1}{4}$ of the entire length; from the tip of the nose to the tip of the pectoral fin as 1 to $2\frac{1}{3}$, or very nearly one-third of the entire length. The colour was smoky brown above, paler beneath; the skin covered with slime, as in the eel, and presenting no indication of scales, under a lens of half-an-inch focus. I mention this because the scales have been minutely described by Dr. Johnston, and I know not whether my observation proves my own inadequate power of examination, or that the scales are not present at the younger age at which my fish was taken. The number of fin-rays was as under:—

1st D. 1: 2nd D. 56: P. 20: V. 5: A. 53: C. 34:

thus in every instance being less than recorded by Pennant. The first dorsal was a slender flexible spine unaccompanied by any membrane, and the ventrals were also flexible spines of different lengths, and only partially united by membrane. When the little fish had become somewhat dry, the "pea-like tubercles" behind the pectoral fin, to which Fleming alludes as distinctive of Raniceps Jago, and Johnston as possessed by Raniceps trifurcatus after death, were very manifest both to the eye and finger. I may perhaps be pardoned for remarking with reference to the discrepancy in the number of fin-rays, that counting of them must not be considered as absolutely distinctive of specific difference, seeing that age, sex, or size of the fish, or the skill of the enumerator, may cause discrepancies such as those above noticed.—*Edward Newman.*

Proceedings of Societies.

Entomological Society.

March 5, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Genera des Coléoptères ou Exposé Méthodique et Critique de tous les Genres proposés jusqu'ici dans cet ordre d'Insectes,' par M. Th. Lacordaire, Tome ii.; presented by the Author. 'Bericht über die Wissenschaftlichen Leistungen im Gebiete der Entomologie während des Jahres, 1852,' von Dr. Herm. Schaum; by the Author. 'Geodephaga Britannica,' by J. F. Dawson, L.L.B.; by the Author. 'List of the Specimens of Dipterous Insects in the British Museum,' part 6, supp. 2, by Francis Walker; by the Author. 'Journal of the Royal Agricultural Society of England,' Vol. xv., part 2; by the Society. 'Proceedings of the Royal Society,' Vol. vii., No. 8; by the Society. 'Journal of the Society of Arts' for February; by the Society. 'The Literary Gazette' for February; by the Editor. 'The Athenæum' for February; by the Editor. 'The Zoologist' for March; by the Editor. 'Magazin des Thierreichs,' Erster Band; by John Curtis, Esq. 'Notes on four Galls from the Crimea,' by John Curtis, Esq., F.L.S. (from the Gardeners' Chronicle); 'On the Genus Myrmica, and other indigenous Ants,' by John Curtis, Esq., F.L.S., and 'Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera,' by John Curtis, Esq., F.L.S. (both papers from the Transactions of the Linnean Society); all by the Author. 'Insecta Saundersiana; Coleoptera Curculionides,' by H. Jekel; by W. W. Saunders, Esq.

Exhibitions.

Mr. Stevens exhibited a quantity of insects of all orders, including several fine new species, being part of the collection made by Madame Pfeiffer, at Amboyna and Ceram. Among the butterflies were the true Ornithoptera Priamus ♀, O. Panthous and O. Amphimedon, *Cramer*. The Lepidoptera came packed between sheets of paper, and the other orders loose in layers between paper and cotton, not pinned; and all had travelled quite securely.

Mr. Edwin Shepherd exhibited a specimen of Arctia Caja, from the collection of Mr. Allis, having the left upper wing marked with two nearly parallel streaks of the same colour as the under wings, crossing the other colours of the wing from the base to the posterior margin. He likewise exhibited, from the collection of Mr. John Scott, a specimen of Triphæna orbona, of which the upper wings were much shortened and the colour was nearly black, the anterior margin being suffused with red. This remarkable variety was taken in Scotland.

Mr. Edward Sheppard exhibited a silken bag of a slight, flossy texture, being one of the kind imported from China as coverings to the ends of the hanks of silk in bales. Dr. Gray said he was informed by Mr. Reeves that each of these bags was only a single cocoon beaten out.

Prize Essay for 1855.

The President announced that the subject proposed for the Prize Essay of the Society this year was the Coccus producing the lac-dye of commerce, towards which, as announced last year, Dr. Royle had promised the assistance of all the information on the subject possessed by the East India Company to any one who would undertake the Essay.

Proposed Catalogue of British Coleoptera.

The Secretary stated that a proposition had been made to the Council that the Society should print a concise Catalogue of British Coleoptera, to facilitate the exchange of specimens among collectors, and thus lead to a rectification of the synonymy. The Council, although aware that at present such a list must be imperfect, were disposed to give the proposition a favourable consideration provided they were assured of support, and they invited communications on this point from Coleopterists generally.

Mr. Westwood thought, that by the united labours of our Members this desirable work might be accomplished.

Dr. Gray said he had long tried to get a Catalogue of British Coleoptera made, but in vain; he was still ready to print one, and to pay the author.

Habits of Eastern Butterflies.

Mr. Newman called the attention of the Meeting to a paper, by Mr. Wallace, 'On the Butterflies of Sarawak,' which appeared in the March number of 'The Zoologist.' The passages to which he referred were as follows:—"The handsome green and blue spotted butterflies, Papilio Agamemnon, &c., fly with the greatest rapidity of any Papilios: the eye can scarcely follow them; in fact they much resemble in habit the humming Sphinxes, and hover over flowers, or more frequently over damp places on the ground, with a constant vibration of the wings. * * * Papilio Iswara, and another species allied to P. Helenus, but I think new, have an undulating flight, very like that of the South American Morphos, or even sometimes approaching that of the large Noctuidæ, and they rest with the upper wings deflexed over the lower." Mr. Newman thought both these facts, the hovering like Sphinxes, and the resting with deflexed wings, extremely interesting: it would be within the recollection of many entomologists that Mr. Swainson and the late Mr. Edward Doubleday had urged the latter character as a reason why Castnia should be united to the Sphingidæ: with this new evidence before us, we may perhaps agree to the conclusion of these eminent Lepidopterists, but we must demur to the reasoning, because if Castnia were a Sphinx only on the ground that it possessed the character of resting with deflexed wings, then Iswara were a Sphinx also. On mentioning this subject to Mr. Adam White, the original describer of Papilio Iswara, and a gentleman whose entomological knowledge is all but universal, he obligingly showed Mr. Newman specimens of allied Papilios preserved, in the matchless collection of the British Museum, with their wings in the position described by Mr. Wallace.

South African Honey-bee.

Under this title Mr. Newman read the following memorandum:—"I believe it is generally supposed that one particular species of bee is entitled to the name of 'honey-

bee,' because the only one that in this country produces honey in sufficient quantity to be serviceable to man; but there are several others. A friend, writing from the Cape, mentions a honey-bee which is even more productive than ours; he describes it as very small, scarcely half the size of Apis mellifica, and very fond of domiciliating in outhouses, and otherwise attaching itself to the homesteads of man. I expect to receive specimens, and shall have much pleasure in handing them to Mr. Smith for examination. Mr. Webster, in his graphic narrative of the 'Voyage of the Chanticleer,' also writes thus on visiting the farm-house of a Dutch boor:—'The first thing that attracted my attention was a swarm of bees that had attached themselves to the parlour-window, occupying the space between the shutter and the glass. On inquiring about them, I found that they had taken a liking to the situation for several years. * * * After the fear of being stung by them was got over, I contemplated the labours of these little creatures with much pleasure, and they frequently afterwards occupied my attention. They are much smaller than our bees, and appeared to be far less irritable, and I was informed that they work during the whole year. They kept the house well supplied with honey, the comb being taken away about eight times during the course of the year, or about every six weeks. The hexagonal form of the cells did not seem to be the result of pressure, and were all of the same form, both at the top and sides. In the course of my observations of them, I frequently saw them removing a portion of wax from one part of the comb to another.' These proofs of the existence of so profitable a honey-bee in the Cape Colony, appear to me very interesting. Mr. Webster's observation about the figure of the cells reminds me of an idea that I carried out three years ago: I obtained a cake of bees' wax and perforated it with circular holes as near as possible together, and afterwards, with a sharp penknife, reduced the walls to the greatest tenuity they would bear without breaking; the result was the formation of closely approximated hexagons, a good deal resembling those made by the bees; but of course much larger and much less regular: I believe the experiment was suggested by a note written years ago by Mr. Waterhouse,* but it seems to imply that the hexagonal form is almost an inevitable result of two grand objects of Nature,—economy of space, and economy of material,—and does not prove the existence of that reflecting power which some have claimed for the bee."

A new Enemy to the Honey-bee.

Under this title Mr. Newman read the following note:—

"You will probably recollect my mentioning some months back, on the authority of Mr. Lucas, a fact which I thought new, that of a fat toad squatting himself on the alighting-board of a bee-hive, watching for the bees and swallowing them one after another as they returned home at night after the labours of a long summer's day. The statement was received with evident distrust: I particularly remember our friend Mr. Hudson thought it impossible for a toad to climb to such a position, and a learned apiarian, a namesake of my own, wrote a reply showing that such an assertion was totally unworthy of serious consideration, and evidently comforted himself in believing he had totally extinguished this supposed new light in bee history. However, there is another glimmer from the same lamp, and exhibited quite incidentally and *à propos* to another anecdote. My informant is Mr. Charles Muskett, of Norwich.

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* Trans. Ent. Soc. III. Proceed. p. xii.

'It is, no doubt, well known,' says Mr. Muskett, '*that the common toad will sit at the entrance of the hive and devour the bees one after another as they come within reach of his tongue;* but a rather singular circumstance occurred a few days since in this neighbourhood; it was witnessed by my brother, and I can vouch for the fact: during the late severe weather, happening to be occupied in the garden, he heard a tapping noise in the direction of the bee-house, and on directing his attention to the spot, observed a woodpecker (*Picus viridis*) drop down on the block and devour the bees as fast as they made their appearance. My brother had previously noticed that the bees diminished in number, and could not account for it: on examining the hive he found the mortar had been pecked away, so that more light was admitted."

Mr. Westwood remarked that the fact that toads were enemies to bees was new and interesting, and he would take this opportunity to mention, as a circumstance that had come under his own observation, and one that he had not seen published, that the common sparrows ate honey-bees with avidity, but only at a certain period of the year, namely, in July, when they had young ones to provide for and there was a lack of their usual food.

On Greasiness in Insects.

Mr. Douglas read the following note:—

"In his Monograph of the Genus Depressaria, published in the 9th vol. of the 'Linnæa Entomologica,' Professor Zeller, in a note under D. ultimella, says he could not distinguish the examples of that species received from Mr. Stainton, on account of the greasy condition of their bodies; and he further remarks, that the greater prevalence of greasiness in English collections, compared with those of Germany, is due to the use of camphor in English cabinets. I have heard this idea before, but esteemed it only as the dictum of an individual; for we often find certain species get greasy even before they are removed from the setting-boards, and this remark applies especially to those Lepidoptera which, in their larva state, are internal feeders. In the cabinet it is almost invariably internal feeders, both Lepidoptera and Coleoptera, which first become greasy. Yet it is perhaps worth while to ask some of our chemical friends to tell us whether there is any foundation for the opinion that the odour of camphor has any influence in developing greasiness in preserved specimens of insects.

"The Germans, I am informed, use quicksilver to keep away mites, and it might be asked, in addition to the question just proposed, whether its presence in the insect-drawers has any influence in preventing the appearance of grease in the specimens. As in Germany it is the practice to mount insects high up on the pins, there is no difficulty in the use of quicksilver, but with us it would be far different, for, as the wings of our Lepidoptera touch the paper, the globules would roll over and destroy them,—that is, if the method of placing it loose in the drawers, as used in Germany, were adopted.

"In France they appear to use no preservative at all, if we may judge from the condition in which specimens of Lepidoptera have been returned to this country; and we know that the fine state of preservation of our collections has excited the admiration of French Lepidopterists.

"For the injury to insects by greasiness, camphine is an effectual remedy; simple immersion therein, however, is not sufficient to prevent the recurrence of greasiness; the specimens should remain in the spirit for several days.

"In old and neglected specimens the pins become quite corroded by verdigris: to prevent the occurrence of this, a method is used in Germany, of which I was informed by Mr. Dohrn: it consists in pushing the pin further through the insect than it is intended to remain, covering the portion immediately below the insect with a solution of gum arabic, and then drawing back the pin, which, by the coating it has received, is preserved from the action of the grease. The same principle has recently been applied in this country, by electro-plating the pins; and it is likely to be of use for those species in which the pin becomes corroded, and yet the grease does not much affect the insect: but the expense of these pins will prevent their general adoption."

Mr. Edward Sheppard said he had found the use of electro-plated pins check the growth of verdigris in greasy insects.

Mr. Edwin Shepherd said he had tried pins doubly-gilt, and yet in some instances he found they were acted on by the grease of the insects. He thought that when the bodies of insects rested on the paper they were more liable to become greasy than when the insect was elevated on the pin, as in the continental method.

Mr. Waterhouse said one great cause of greasiness was the placing insects in the cabinet soon after they were captured.

The President said that in the continental cabinets, where quicksilver was used, it was confined to grooves in the bottom of the drawers.

Captain Cox said that so long as he kept his insects in London none of them were greasy, but having removed them into the country, near to a running stream, forty or fifty of them have become greasy, and this effect he attributed to the moisture of the atmosphere of the place.

Mr. Janson read the following two notes by Dr. H. Schaum, of Berlin.

On Heterorrhina bicostata, Westwood.

"Mr. Westwood has lately given, in the 'Transactions' of this Society, New Series, iii. p. 66, some details and a drawing of an African Heterorrhina, which he considers to be the H. bicostata, published by me in the fifth volume of the 'Transactions,' p. 65. He asserts that the unique specimen described by me, is in Captain Parry's collection, and that his drawing had been taken from that specimen.

"I beg to state that this assertion is not correct, but that my specimen was from the cabinet of the late Mr. Melly (as indicated by me l. c. p. 65), and is now in the possession of his son. I mention this, because a comparison of Mr. Westwood's figure with my description leads me to the opinion that the H. bicostata of Mr. Westwood is specifically distinct from the insect published by me.

"The following differences seem to exist between the two insects: in the typical specimen of Heterorrhina bicostata of Schaum the thorax is unusually small; the mesosternal part of the sternal process short; the four posterior tibiæ deeply sulcated inside; while in the specimen figured by Mr. Westwood the thorax is of the usual size, the mesosternal process long, and the four posterior tibiæ without furrows on the inside. Furthermore, the anterior tibiæ are simple in Mr. Melly's specimen, while they are armed beyond the middle with a broad, though obtuse, tooth, in Captain Parry's insect. On this last difference I lay, however, but little stress, as it may arise from the two specimens belonging to different sexes. For, though Mr. Westwood designates his specimen as a male, I am inclined to draw from his own words the con-

clusion that it is a female. The presence of a tooth on the outside of the anterior tibiæ would itself be quite an anomalous character in a *male* of a green African Heterorrhina, and the indication, that the abdomen has "a *slight* oblong-oval *impression*," seems as little to support Mr. Westwood's opinion, for in all other species the abdomen of the male shows a *broad* and *deep furrow* along its middle.

"It might seem ludicrous for me to discuss the sex of an insect, which I have not seen, and I would certainly have refrained from doing so, if I had not compared in the Royal Museum, at Berlin, a specimen taken in Mosambique by Dr. Peters, which I suppose to be the male of Mr. Westwood's insect. It agrees well with the figure of the latter, except that it is considerably smaller, that the anterior tibiæ are unarmed, the tarsi longer, and the abdomen with a deep excavation in its middle. These are, however, differences, which, in the genus Heterorrhina distinguish the males from the females.

"If my supposition proves to be correct it will become necessary to bestow another name to Heterorrhina bicostata of Westwood.

Remarks on Mr. Curtis's recent Descriptions and Figures of British Elateridæ.

"The descriptions and figures of some British *Elateridæ*, published by Mr. Curtis in the 'Transactions' of this Society, New Series iii., p. 10, enable me to point out under what names most of these species have been described by continental authors.

"Ectinus? gagates, *Curt.*, is undoubtedly Ampedus lugens, of Redtenbacher and Germar, as stated already by Mr. Janson in the 'Entomologist's Annual' for 1855, p. 98.

"N. G.? punctolineatus, *Curt.*, is perhaps Ampedus scrofa, *Germ.*, though I have never seen a specimen of the latter which attains the size given by Mr. Curtis, and in which the smooth line down the centre of the thorax, mentioned by Mr. Curtis, is well marked.

"Elater nigrinus, *Curt.*, seems better to agree with Ampedus obsidianus and brunnicornis, *Germ.* (which are varieties of the same species as recognised by Germar himself) than with the true Amp. nigrinus, Payk., Gyll.

"Aplotarsus maritimus and Cardiophorus formosus, *Curt.*, are unknown to me. Should not the latter be regarded as a foreign insect accidentally introduced into England?

"Aplotarsus? cothurnatus, *Curt.*, is in all probability Ampedus subcarinatus, *Germ.*

"I take advantage of this opportunity to state that the Lathrobium carinatum, *Bold.* figured in the 'Entomologist's Annual,' is angusticolle, *Er.*"

Observations on British Elateridæ.

Mr. Janson also read some observations, by himself, on the British Elateridæ, alluded to by Dr. Schaum.

M. Henri Jekel communicated, through Mr. Waterhouse, the following

Note on Omias sulcifrons.

"A very interesting fact for the British Fauna should be the increase of a genus in the family Curculionidæ (though adding no new species), if sufficient generic differences were to be found.

"M. Jacquelin Du Val has shortly described and figured in his 'Genera des Coléoptères d'Europe,' page 13, plate 10, fig. 21 bis et 21 bis A, under the name of Barypeithes rufipes, an insect which is nothing but the Omias sulcifrons, *Sch.*, t. vii. pars 1, page 143, a species, as far as I am informed, only found, until the present time, in England, but now also pertaining to French-Britain's Fauna, the specimens in the collection of M. Chevrolat having been caught in the neighbourhood of Brest; no unusual fact, for I have received from M. de Leseliuc, who resides in the Department du Finestère, several species, which had been recorded as British only before his investigations. The national name of British is then not the only point of resemblance between the two countries.

"The value of M. Jacquelin Du Val's generic characters, as well as the place he gives to this insect (which, in my opinion, should be connected with Omias), I propose to discuss in my next note. I venture to say at present, that both the description and the figure do not permit one to recognise the insect, and I have to add that Boheman's description in Schönherr (loc. cit.) is perfect."

Entomological Botany (with more especial reference to the Plants frequented by the Tineina). By H. T. Stainton, Esq.

(Continued from page 4457).

Vitis vinifera. The Vine.

A sufficiency of this plant is grown in England, more especially in the South, where it ornaments the front of many a cottage, to render it worthy of notice independently of its claim to our special attention as the only food-plant of Chærocampa Celerio; whilst the allied species, Deilephila Livornica, Chærocampa porcellus and C. elpenor, are also partial to this plant. Speyer gives Agrotis aquilina as a vine-feeder; but I think if Guenée were consulted on this point he would dissent; the habit of the larvæ of the genus Agrotis, according to his observations, being to conceal themselves among roots during the day, only protruding the anterior segments of the body sufficiently to reach the lowermost leaves of the surrounding herbage (Guenée, 'Histoire Naturelle des Noctuélites,' vol. i. p. 254). Speyer also mentions Lobesia reliquana as feeding on the vine. But there are two Micro-Lepidopterous larvæ which are great enemies to the vine-growers of the South of Europe, Œnectra Pilleriana, on which several essays have been written in France, to show the best modes of preventing the ravages of Le Pyrale de la Vigne, and Eupæcilia ambiguella (roserana, *Frölich*), which latter feeds on the young flower-buds, thereby

assisting Father Mathew in the temperance-movement most essentially. The larva of Œnectra Pilleriana is not exclusively a vine-feeder, having been noticed on many low plants, and Mr. W. Wilson Saunders found it some years ago in the Isle of Wight, in the green capsules of Iris fœtidissima. The larva of Elachista? Rivillei, to which attention has recently been drawn in the 'Transactions of the Entomological Society,' vol. iii. N. S. (Part 3) pp. 87—89, is also a vine-feeder, and may very probably be found in the South of England.

Geranium. Crane's-bill.

As a general feeder on this genus of plants Speyer mentions Clisiocampa castrensis, of which, however, the sea wormwood (*Artemisia maritima*) is, I believe, the principal food-plant in this country.

Geranium pratense. Meadow Crane's-bill.

On the capsules of this plant in August may be found the larva of Heliothis marginata; Duponchel and Guenée, however, both seem to agree in representing it as very difficult to rear.

Geranium Robertianum. Herb Robert.

Though so common a plant, frequenting many a pleasant hedge-bank, we do not know of any Lepidopterous larva specially attached to it. Zeller has, indeed, suspected ('Linnæa Entomologica,' vol. vi. p. 341) that the larva of Pterophorus acanthodactylus feeds on this plant, he having found the larva of that species on a Pelargonium in his garden, and having frequently taken the perfect insect among Geranium Robertianum. Of course the larvæ of a Pterophorus must be sought for on the flowers or seeds, for they are great epicures.

Erodium cicutarium. Hemlock-leaved Crane's-bill.

A common plant on sandy or gravelly soils, and assigned by Speyer as a food-plant to Polyommatus Agestis. I wonder if any of our Lewes or Brighton collectors could find the larva of that species, for no doubt Mr. Logan would be extremely glad to see it, and compare it with his larvæ of P. Artaxerxes, which I am still inclined to think only a climatic variety of P. Agestis.

Linum usitatissimum. Common Flax.

Speyer mentions, from his own observations, Calocampa exoleta as feeding on this plant; but I am not aware of any other Lepidopterous

larva attached to it, though I am strongly disposed to think that several species of Micro-Lepidopterous larvæ might be found if the flax-fields were carefully examined by the entomologists who happen to be located in their vicinity.

Impatiens Noli-me-tangere. Yellow Balsam.

Why should we use Noli-me-tangere as a specific name for a plant, and yet scruple to use Pavonia-minor for a moth?—if names composed of two words are objectionable, why use a name composed of three?

Speyer gives Coremia ligustrata as feeding on this plant, the larva being figured on it by Hübner; Duponchel says it feeds on several low plants, and not on the privet; hence no doubt some purist in nomenclature would like to change its name, though I have no doubt, if the name itself could speak, it would say "Noli-me-tangere."

Oxalis Acetosella. Wood Sorrel.

This pretty little plant, with its delicate green leaves and graceful white flowers, is partial to woods, showing itself from beneath the fallen leaves simultaneously with the more robust wood Anemone (*Anemone nemorosa*). The Oxalis Acetosella is not known as the special food-plant of any Lepidopterous larva; but two Noctuæ (not hitherto known as British), Mesogona Acetosellæ and M. Oxalinæ, have received their names from it: the larvæ of these feed on various low plants in May and June.

Euonymus Europæus. Spindle-tree.

A common shrub in hedges and woods. Speyer enumerates as feeding on the spindle, Acherontia Atropos, Ennomos evonymaria a Geometra, in spite of the abundance of its food-plant with us, not hitherto detected as British), and Zerene adustata. One of the most interesting of the spindle-feeders is Acrobasis angustella, of which I believe only two British specimens are extant; it is double-brooded, the larva feeding in July between united leaves, and in the autumn in the fruit of the plant: strange that with this knowledge we cannot find the insect! It is on this plant that three species of Hyponomeuta feed, H. Evonymellus, H. irrorellus and H. plumbellus; H. Evonymellus is, indeed, notorious for its occurring on spindle-bushes, frequently to such an extent as completely to defoliate them; and the ignorant, of course, concluding that the caterpillars that made white

webs on the spindle were identical with those making similar webs on the apple-trees, and, having noticed that the spindle was more infested by them than the apple, have gravely suggested that spindle-trees should be freely planted in gardens and orchards to attract to them the larvæ which would otherwise injure the apple-crops: there is no necessity to revert to the time of Rösel's gardener to show that horticulturists would be wiser "in their generation" for some *knowledge* of insects and their habits. The larva of H. Evonymellus does not attach itself to orchard-trees; nor should we find it in our gardens at all unless we kindly planted the spindle-tree purposely for its accommodation. Of Hyponomeuta irrorellus, formerly so great a rarity, the larva has lately been discovered by Mr. Kirby, of Wandsworth, feeding on this plant in July, the same bush sometimes affording shelter both to this species and the preceding. The observations of Lewis and Zeller have shown that the eggs of the apple-feeding Hyponomeutæ are hatched *at the end of summer*, and that the larvæ remain, under the glutinous covering which is deposited on the top of the cluster of eggs, without feeding till the following spring, when of course the larvæ are pretty hungry after their seven months' fast, and commence feeding on the young leaves with a good appetite. The larva, however, of Hyponomeuta plumbellus has a very pecular habit, for, though we know not when it emerges from the egg, yet its first appearance in the spring is not as a feeder on leaves, but it feeds on the pith of the young shoots, and its presence may be recognised by the drooping of the terminal leaves, just as though they had been pinched by a late frost in April; the larvæ, however, soon quit their abode in the twigs, and come out to feed on the leaves, making small webs; for this species is not gregarious, only a few occurring on one bush: after the larva has quitted the stem of the twig, the rapid growth of the plant soon enables the drooping leaves to revive; so that in a short time there is nothing to betray the whereabouts of the larva but the slight web that it makes. How necessary it is to be cautious in generalizing!

The larva of Theristis caudella also feeds on this plant: it lives gregariously two or three together within a broad web, in June and July ('Treitschke,' ix. 2, 43).

Rhamnus Catharticus. Buckthorn.

A plant widely distributed, occurring in hedges; but, as far as my experience goes, I have never seen it in any plenty; however, it is

rather a close-growing shrub, and affords considerable shelter for insects. The beautiful velvety green larva of Gonepteryx Rhamni first claims our attention. Speyer also gives Polyommatus Argiolus as feeding on the buckthorn, though I believe it is more partial to the flowers of holly and ivy. Speyer next mentions the larvæ of three of the Geometridæ, Scotosia Rhamnata, S. vetulata and Triphosa dubitata: the larva of S. vetulata feeds in the young leaves before they are fully expanded, and is very plentiful at the beginning of May; but when it quits the young leaves it appears to conceal itself most effectually, as after it is half-grown it is extremely difficult to find. The larva of Bucculatrix Frangulella is stated by Zeller to feed on Rhamnus Catharticus, as well as on R. Frangula, to which latter the observations of most authors have restricted it. Nepticula Catharticella is very abundant, in the larva state, on this plant, in July and October. Some idea of the appearance of the leaf mined by this Nepticula larva may be gathered from the annexed wood-cut.

H. T. Stainton.

Mountsfield, Lewisham,
March 4, 1855.

(To be continued).

NOTICES OF NEW BOOKS.

'*The Annals and Magazine of Natural History.*' Nos. 85 to 88, dated January to April, 1855; *price* 2*s.* 6*d. each.* London: Taylor & Francis, Red Lion Court, Fleet Street.

No. 85 contains the following papers:—

'Notes of an Excursion to the South of France and the Auvergne in Search of Diatomaceæ.' By the Rev. William Smith, F.L.S., Professor of Natural History, Queen's College, Cork.

'Amended Characters of the singular Lymneadous Genus Camptoceras, and Description of a new Ancylus, inhabitants of North-Western India.' By W. H. Benson, Esq.

'Characters of the Genus Opisthoporus, an Eastern form of the Cyclostomacea, with Remarks on its Affinities, and Notes on several Opercula.' By W. H. Benson, Esq.

'On Artificial Sea Water.' By Philip H. Gosse, A.L.S.

'Notes on Swiss Mollusca.' By J. Gwyn Jeffreys, Esq., F.R.S.

'Sketch of the Life of the late Professor Edward Forbes.' By J. H. Balfour, M.D., Professor of Botany, Edinburgh. [From 'Transactions of the Botanical Society of Edinburgh.']

Bibliographical Notices:—'The Entomologist's Annual for 1855;' edited by H. T. Stainton. 'A Catalogue of British Fossils;' by John Morris, F.G.S. (second edition). 'Popular Conchology;' by Agnes Catlow (second edition).

Proceedings of Societies:—Zoological.

Miscellaneous:—Note on the Reproduction of Ligula; by M. Brullé [from the 'Comptes Rendus' for October 23, 1854, p. 773]. Description of the Animal of Cyclina Sinensis; by Dr. J. E. Gray. Observations on the Development of Actinia; by M. Lacaze-Duthiers [from the 'Comptes Rendus' for August 28, 1854, p. 434].

No. 86 contains the following papers:—

'Some Account of the Actiniadæ found upon the Coast near Teignmouth, Devon.' By Robert C. R. Jordan, M.B. Lond., Professor of Comparative Anatomy, Queen's College, Birmingham.

'On a Monstrous Oyster Shell.' By George Busk, Esq.

'On Hypericum anglicum.' By Charles C. Babington, M.A., F.R.S., &c. [From the 'Proceedings of the Botanical Society of Edinburgh.']

'On the Ornithology of Malacca.' By A. R. Wallace, Esq.

'Descriptions of the Animals of certain Genera of Bivalve Shells.' By S. P. Woodward, Esq., F.G.S.

'On Fossil Echinoderms from the Island of Malta; with Notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds.' By Thomas Wright, M.D., &c.

'Notes on British Zoophytes, with Descriptions of New Species.' By the Rev. Thomas Hincks, B.A.

'On the Marine Vivarium.' By C. S. Harris, Esq.

Proceedings of Societies:—Zoological—Linnean—Royal—Botanical of Edinburgh.

Miscellaneous:—Observations on the Nests of Humming Birds; by John Gould, Esq., F.R.S., &c. [from Proc. Zool. Soc. July 26, 1853]. On a Marsupial Frog (*Notodelphys ovifera*) from Venezuela;

by Dr. D. F. Weinland [from Müller's Archiv for December, 1854, p. 449]. Descriptions of Two New Species of Ptilonopus; by George Robert Gray, F.L.S., F.Z.S. [from 'Proceedings Zool. Soc.,' Mar. 22, 1853].

No. 87 contains the following papers:—

'A Monograph of the Indian Species of Phylloscopus and its immediate Affines.' By Edward Blythe, Esq. [From the 'Journal of the Asiatic Society of Bengal,' No. 5, 1854].

'On Fossil Echinoderms from the Island of Malta; with Notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds.' By Thomas Wright, M.D.

'On the Genera Pionandra, Cliocarpus and Pœcilochroma.' By John Miers, Esq., F.R.S., F.L.S., &c.

'On the Discovery of Viviparous Fish in Louisiana.' By B. Dowler, M.D. [From 'Silliman's Journal' for January, 1855].

'On the Anomalous Oyster-shell described in the 'Annals' for February.' By Dr. J. E. Gray.

'On Actinophrys Sol.' By E. Claparède [Abridged from Müller's Archiv for December, 1854.]

Proceedings of Societies:—Zoological—Royal—Botanical of Edinburgh.

Miscellaneous:—On the Movements and Reproduction of the Naviculæ; by M. Focke [from the 'Comptes Rendus' for Jan. 22, 1855, p. 167]. On Lottia zebrina and L. Scurra; by Dr. J. E. Gray. Description of a New Species of Sorex from India; by R. Templeton [from Proc. Zool. Soc., July 26, 1853].

Dr. Dowler's paper on Viviparous Fish is extremely interesting: the following is an extract:—

"In the month of October, 1854, through the politeness of J. C. B. Harvey, M.D., of Tchoupitoulas Street, I received a small osseous fish, caught in the New Orleans Canal, which connects the city with Lake Ponchartrain. This fish had been placed in a basket containing crabs, one of which wounded it slightly in the abdomen, near the cloaca, thereby exposing several fœtal fish enveloped in a delicate membrane. The parent fish, which had been rudely thrust into a narrow-mouthed phial of spirits, retains, after immersion for two weeks, the original *rigor mortis*, and the same remark applies to the fœtuses, though they have been soaked in water some of them have been forcibly straightened. On the 17th of October, in the presence of, and assisted by, Drs. J. Hale and M. M. Dowler, I enlarged the

wound,and proceeded to dissect a somewhat globular mass of fœtuses, bounded by the intestines before, and separated from them by an indescribably thin, diaphanous membrane; this mass was further bounded above by the spine and ribs, below and behind by the posterior inferior abdominal walls, bulging backward of the anal orifice and fin. The exterior envelope of this oblong globe consisted of a very thin, pellucid, extremely delicate and apparently laminated and flocculent membrane, like the amnion of the human embryo in the early state: it did not form a simple sac, but consisted of many duplications, like the arachnoidal reflections among the sinuosities and convolutions of the human brain, sending its prolongation as the hyaloid membrane does through the vitreous mass of the eye. This uterine membrane (ovisac it cannot be termed) contained twenty-two fishes. It is probable that the inner surface of the uterine membrane sent forth a still more delicate membrane, which enveloped each fish after the manner that the peritoneum envelopes the abdominal viscera; but the parent fish, and still more its enclosed organs, were too minute to admit of full demonstration during a necessarily hurried examination; moreover, the wish not to mutilate the parent fish very much prevented a fuller dissection of the fœtal mass *in situ*. Each fœtal fish was doubled laterally, sometimes to the right, sometimes to the left, into a globular form: the caudal fin, which is inclined to the lancet shape, though blunter, overlapped one eye and one side of the mouth: each fish *in situ*, and even after forcible extraction from its bed, was enfolded in a sac: some were drawn out united by pedicles to a common stem, somewhat like an umbilical cord. These fœtal fishes presented a perfect example of close packing. A perceptible force was required to dislodge them from their beds. The concavity left by their extraction appeared to be lined with a smooth, black, peritoneal membrane. The intestines, which were very minute, were crowded forward by the rounded mass of fœtuses which occupied the greater portion of the abdominal cavity. No ova were discovered.

"Without attempting fully to describe even the dermal skeleton, I may observe that this tiny fish is a most symmetrical one. Its minuteness may be imagined when I state that after the removal of the enclosed fœtuses it weighed only seven grains, though not disemboweled. Thorough desiccation would probably reduce its weight one half or more. The fish exposed for two hours in the shade on a damp day was but slightly desiccated. It was weighed by Mr. Macpherson, apothecary, in my presence; but fearing a mistake I had it weighed a second time, with the same result. If each fœtus weighed

but one grain, the aggregate would be more than three times that of the mother."

No. 88 contains the following papers:—

'A Comparative View of the more important Stages of Development of some of the higher Cryptogamia and the Phanerogamia.' By Charles Jenner.

'Observations on the Natural History and Habits of the Common Prawn (*Palæmon serratus*).' By Robert Warington, Esq.

'Report on a Collection of Diatomaceæ made in the District of Braemar by Professor Balfour and Mr. George Lawson.' By R. K. Greville, LL.D., &c.

'On Fossil Echinoderms from the Island of Malta; with Notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds.' By Thomas Wright, M.D., &c.

'On Monopus medusicola, a species of Leech.' By Philip Henry Gosse, A.L.S.

'On Ancylus oblongus and A. fluviatilis.' By William Clark, Esq.

'On Actinophrys Sol.' By E. Claparède. [Abridged from Müller's Archiv for December, 1854.]

Proceedings of Societies:—Royal—Zoological—Linnean—Botanical of Edinburgh.

Miscellaneous:—On the Anomalous Oyster-Shell; by Professor J. S. Henslow. Description of a New Species of Corynactis; by William Thompson [from Proc. Zool. Soc., Nov. 8, 1853]. On the Species confounded under the Name of Laminaria digitata, with some Observations on the Genus Laminaria; by M. A. Le Jolis [from the 'Comptes Rendus' for Feb. 26, 1855, p. 470]. Descriptions of two New Species of Humming Birds from Pera; by John Gould, Esq. [from Proc. Zool. Soc., November 22, 1853].

'*A List of the British Species of Geodephaga, intended for marking Desiderata and labelling Collections, taken from Mr. Dawson's Geodephaga Britannica.*' By G. Guyon, Richmond, Surrey. *Price (prepaid by post) Four Stamps.*

This, although merely a list of names, will be found highly useful to the Coleopterist; and I sincerely hope may have the effect of

increasing the sale of Mr. Dawson's work, since many of the specific names, brought into use by that careful author, are unintelligible until accompanied by his own satisfactory explanations: the synonyms would have made the list far more valuable to the student; but would certainly, at the same time, have trebled the cost.

'*The Entomologist's Annual for* 1855, *comprising Notices of the New British Insects detected in* 1854.' *Lepidoptera*, by the EDITOR. *Hymenoptera*, by FREDERICK SMITH. *Coleoptera*, by E. W. JANSON. Edited by H. T. STAINTON. London: Van Voorst. 1855.

The same Work. Second Edition, with considerable additions, including Instructions for Collecting, Preserving and Arranging Insects, and an Address to the Young Entomologists at Eton, Harrow, Winchester, Rugby, and at all other Schools. 154 pp. 12mo. One coloured plate. *Price* 2*s.* 6*d.*

THIS work is a very useful one: it is the following out of a plan which I think originated with myself, of giving a summary, at the end of the year, of our entomological doings during the year: this was partially and imperfectly carried out in the Preface to several successive volumes of the 'Zoologist,' but was suspended on my election to the chair of the Entomological Society in favour of the new obligation then devolving on me of preparing an annual address. Thus a hiatus of two prefaces has occurred, the matter, however, appearing in a somewhat altered form; and I trust, life and health permitting, to resume the agreeable task at the close of 1855.

Although, in the explanatory title of the 'Annual,' which I have given *verbatim*, the Editor only promises a summary of the labours of the year, yet these constitute but an infinitesimal part of the book itself: thus the Lepidopterous portion is headed after this fashion—"New British Species since 1835," which, according to my comprehension, comprises twenty years instead of one. The Hymenopterous summary is a retrospect of all discoveries since the 'Monographia Apum,' a period of fifty-three years! The Coleopterous summary, commencing with 1839, comprises sixteen years. This is indeed so much more than bargained for, and is most acceptable, but is quite at variance with the character of an annual summary.

With regard to the second edition, the additions are admirable: the directions by Mr. Wollaston on collecting Coleoptera are the best of the kind hitherto offered for the instruction of the juvenile entomologist.

The annexed wood-cut, representing Zygæna Minos, one of the novelties of the year, has been most obligingly lent me by the Editor of the 'Entomologist's Annual.' My readers will recollect that this novelty was captured in Ireland, as recorded in the pages of the 'Zoologist.'

'*The Aquarium: an unveiling of the Wonders of the Deep Sea.*' By PHILIP HENRY GOSSE, A.L.S., &c. London: Van Voorst. 1854. Post 8vo, 276 pp. letter-press, six coloured plates and six lithographs. *Price* 17*s. cloth.*

MR. GOSSE is one of the most prolific and pleasant of writers, and, were it not that he occasionally introduces extraneous topics rather too freely, his book would be a most captivating fire-side companion. I must, however, protest against what has been called "the introduction of religious homilies *à propos* to nothing." I will give Mr. Gosse's heading of an entire chapter in order to illustrate my meaning:—

"A Meditation—The Spiritual Uses of Natural History—Extremes of Opinion—Spiritual Warrant for the Study—Its Limits—Three Inspired Modes of Treatment—I. Direct Testimony to God—Founded on our Ignorance—On our Knowledge—Various Attributes of God discoverable—Responsibilities—Cain's Offering—II. Moral Lessons by Examples—III. Spiritual Parallelisms—Similes—Types—Symbols—Allegories—God's Message of Grace."

I have nothing to object to in the mode of treatment: I am willing to believe that an Archbishop of Canterbury himself would not have handled the subject more logically or expressed it with greater unction; but is it in keeping with what immediately precedes? "Fiddler Crab—A 'Striking' Species—Ferocity—Greediness—Tit for Tat—An Odd Fish—Rubbish—A Fine Beard, &c. &c." Is it in keeping with the objects for which the book is ostensibly written? Is it in accordance with the impression by which every advertisement of the book seeks to secure purchasers? Are we anywhere told, or is it even hinted, that the book is mentally medicinal, a drastic curative, the

unpleasant flavour of which is to be concealed in the saccharine vehicle of Natural History?

It must, however, in fairness, be stated that Mr. Gosse's 'Aquarium' is a most agreeable and delightful book, and that the saccharine vehicle predominates to a great extent. There are multitudes of passages marked for extract, passages which nothing but the want of space prevents my transferring to the 'Zoologist,' and which may still be considered as standing over for a more leisure moment: in the mean time, let me intreat Mr. Gosse to separate his theological from his physical labours, and to learn the truth that a Natural-History writer may be truly pious, may even convey religious instruction to his readers, without making the dose so powerful as that presented to us in the 'Aquarium.'

'*A Brief Memoir of the Life and Character of William Baker, prepared principally from his Diary and Correspondence.*' By JOHN BOWEN. Taunton: May, 1854. 128 pp. 8vo.

THIS is a brief but interesting memoir of a most intelligent man: it is penned by one who, to feelings of true and genial kindness towards the deceased, adds an amount of veneration that seems almost boundless for his scientific acquirements; and thus we have an inflated panegyric rather than a faithful biography. Poor John Bowen had paid the debt of nature before this memoir reached my hands: he survived his friend but six months: William Baker died on the 8th of October, 1853; his devoted friend and biographer on the 29th of March, 1854.

> "Scarce had lamented Forbès paid
> The tribute to his minstrel's shade:
> The tale of Friendship scarce was told,
> Ere the Narrator's heart was cold."

It is difficult to say a word in depreciation of a memoir published under such circumstances as these; but Mr. Bowen was no naturalist, and, believing Mr. Baker to be a profound one, and taking in the most implicit faith *omne ignotum pro magnifico*, he brings into painful prominence little inaccuracies over which a naturalist would have drawn a veil: for instance, Mr. Baker wrote and pronounced a very common word "amphibœa;" Mr. Bowen preserves the spelling: Mr. Baker

writes of "the bronze-winged Bipustulata;" Mr. Bowen preserves this: a naturalist would have quietly given the term a meaning by making it Malachius bipustulatus. Of course a man of Baker's industry and Gilbert-White-like observance of natural phenomena was visited by naturalists passing through the town where he resided; Mr. Bowen regards him such a law-giver in Science that these were the visits of philosophers coming from the ends of the earth to sit at his feet. The following passage explains the observing, truth-seeking character of the man, even up to the last days of his life, and, at the same time, corrects his biographer's assumption that Mr. Baker's knowledge of Natural History was universal and profound:—"The very last exercise of this talent (drawing) was on the larva of the death's-head moth, an unusually coloured specimen of which was sent him by his friend Mr. Richard Anstice. This was thought a new species, and another drawing made and sent to Mr. Newman, the Zoologist, who found it to be only a variety of the Sphinx Atropos, differing somewhat from the usual specimens in size and colour."—p. 119. Such inquiries frequently reached me, often couched in terms of child-like simplicity; always in a spirit of diffidence and evident distrust of his own knowledge. It was this excess of diffidence, this fear of recording observations that might be unimportant or trifling that prevented William Baker from giving to the world a work equal in interest to White's 'Selbourne' itself.

When, at fourteen years of age, he was bound apprentice, he says, "I was so well acquainted with the nests and eggs of birds, their songs, and even their call-notes, that I readily recognised those of one species from another. In after life I have never improved, I think, and have scarcely retained the delicacy of my ear for the ever-charming music of birds."—p. 6.

During his apprenticeship he was a fifer in a volunteer corps, raised to fight the French; and also an actor: in his own Diary Mr. Baker introduces us to one of the same craft, who afterwards became more famous as a Shaksperian tragedian than any other Britain has produced. For the benefit of Mrs. Kent, an invalid actress then at Bridgewater, it was agreed, with the assistance of a Mrs. Cary and her two sons, and of two or three amateurs, among whom were young Baker and his biographer, Bowen, to perform the 'Merchant of Venice.' "The arrangement and study of our parts brought us altogether on evenings, after the hours of business, and the talent and agreeable person of the younger Cary, about sixteen years of age, were very attractive. I became particularly acquainted with him, and was

exceedingly partial to him."—p. 13. After three or four "good houses" in Bridgewater, the company, with the exception of Baker, toured the neighbourhood, performing in Cannington, Stowey, Wiveliscombe and Crowcombe. "Here, then," continues the narrator, "in barns and village inns, were displayed the youthful talents of the future prop of Drury Lane—the magnet of attraction, the star before whose brightness all rival influences were to become pale." This talented and agreeable young Cary of course became Edmund Kean: whether he changed his name by Act of Parliament or by what other process this deponent knoweth not.

In 1804 Baker marched with his regiment, as second fife, to Taunton, and while stationed there on what he calls "permanent duty," began his first entomological collecting. In 1805 a second march to Taunton was effected, and "I had now attained," he writes, "to the honour which I had been ambitious of; I took my place at the right hand of the front line of our little band, and was its leader."

He, however, very soon gave up soldiering, and obtained employment as a journeyman currier in London; and his account of attending lectures, especially against the use of gas, then proposed for street illumination, is curious. "Every possible evil was prognosticated from explosions and poisonous exhalations. In proof of this, birds, rabbits, and other animals were exhibited to audiences under bell-glasses, and an atmosphere of gas admitted to the luckless prisoners in their confined cells, and, as foretold, death of course speedily followed."—p. 36. What reader of the 'Zoologist,' residing in any of our large towns, has not since seen the same scenes enacted against railways? Some patriotic gentleman, selected for oratorical power, presiding in the chair, eloquently describing railways as an invention of the Evil One, and lashing the butchers, bakers and tailors into a whirlwind of phrenzy at the idea of London mutton chops, London penny rolls and London trowsers being introduced into their hitherto peaceful homesteads! then, in sepulchral intonations, describing their wives as inmates of unions, and their children as begging bread. Baker neither liked London nor the anti-gas agitation; he was surprised at the want of knowledge exhibited by the lecturers; he was startled at the obstinate resistance to what he considered so great a boon: and he records that his friend Bowen from that time contracted an aversion to lectures and lecturers, with but few exceptions, which he never overcame. He pined for the country, and soon had an opportunity of leaving London on what is usually called "the tramp," seeking, and sometimes obtaining, employment in the larger towns, as, for instance,

at Northampton, Nottingham, Hull, Newcastle, Kirkaldy and Glasgow. In his notes of this tour there is little of Natural History; but at Kirkaldy, on the 3rd of October, he says, in a letter to his parents, "The robins are come into the gardens singing their plaintive songs; I know from this that the beauty of your garden is fading. When I was at home the withering flowers and the robin's song used to make me sweetly melancholy. I am surprised to see the swallows flying about in this part yet. I have not forgotten my collection of insects since I have been out, for I have caught several moths and butterflies, which I have preserved in Thompson's 'Seasons.'" [!]

At the age of twenty-two, he settled at Bridgewater in a small currier's shop, and two years afterwards married. He now commenced in earnest that collection of insects which is supposed by his friends to have eventually become unrivalled. I use the expression "supposed" because I am not aware, from the evidence of any entomologist, what was the extent of a collection which was undoubtedly the wonder of his own neighbours and acquaintances. He continued forming and arranging this collection, without the aid of any books whatever, and, when he subsequently obtained a work compiled from Linnæus, he found that he had made a very similar arrangement of the various groups. Shortly afterwards he purchased Donovan, and feasted on this expensive publication.

At this time his attention was also occupied by birds, fishes, reptiles, and especially by fossils, and although he describes himself as "travelling round and round his counter, cutting heel-taps, weighing sparrow-bills and counting hob-nails," yet his heart was in Science; and now commenced a correspondence with Dr. Leach, which exhibits that learned entomologist in a very amiable light, and as rendering every assistance to this comparative tyro in the science. In a letter to Dr. Leach, dated October, 1818, Mr. Baker records the great number of Colias Hyale and Vanessa Cardui that occurred that autumn in the neighbourhood of Bridgewater: the former had not been seen for four years.

We next find Mr. Baker corresponding on fossil saurians and lily encrinites; moving into more extensive premises; and converting a spacious loft into a museum, "where the boa constrictor could stretch its vast length along, and the solan goose and the swan expand their wings unchecked," and the biographer speaks of this museum as "that motley store which was open to everything, from the head of an alligator to the egg of a humming-bird." These passages given by a kind-hearted and almost worshipping friend, are no doubt strictly true, but

do not impress the scientific reader quite so favourably as the admiring writer. A taste for the miscellaneous collecting of curiosities is not exactly that development of scientific talent which leads to lasting and beneficial results. It was, however, in Geology that William Baker attained most proficiency; he was elected a member of the Geological Society, and attained the lasting friendship of many of the most eminent professors in that seductive science. He was a man of perfect integrity and strict moral conduct; a diligent tradesman, supporting an expensive family by his own unwearying industry; a kind and hospitable friend; and in every sense of that too common-place expression, a "good man." I knew him personally, and enjoyed his company. I well recollect the animation with which he explained to me his views respecting the identity of the salmon and trout, a subject on which he had experimented and observed for many years: I am aware of the danger of misrepresenting the views of one who declined to reduce them into form for publication; but the impression left on my mind by his conversation was, that he believed all our Salmonidæ to constitute but a single species, races of which, by long isolation in lakes and streams, assumed different specific appearances, and, reproducing *inter se*, perpetuated their peculiarities: but that the entire series and "system," so to speak, of our supposed species and varieties, might and would be reproduced in the process of time from a single pair of either.

To write a memoir of William Baker, more faithfully portraying his estimable qualities as a man or less correctly setting forth his undoubted qualifications as a naturalist, were almost impossible. As showing how a good man can struggle upwards under every difficulty, it is a valuable essay; as a contribution towards Natural-History biography, it is all but useless.

Observations on the Natural History and Habits of the Common Prawn (Palæmon serratus). By Robert Warington, Esq.*

Having during the years 1852 and 1853 had the opportunity of making some observations on the natural habits and minute characteristics of the common prawn (*Palæmon serratus*), which I understand

* From the 'Annals and Magazine of Natural History' for April, 1855, and obligingly communicated by the author.

are novel, I have been induced to collect the results together, and submit them to the readers of this Journal.

The observations about to be detailed were made in the small tanks or aquaria already described,* in which the balance between the animal and vegetable organisms in a medium of sea water was permanently maintained without artificial aëration or disturbance. The materials employed for effecting this, in the aquarium now under consideration, consisted of the Ulva latissima and Enteromorpha as the vegetable members of the circle; several varieties of Actinia, Madrepora, Annelida and Palæmon, to represent the animal section; while the functions of the scavengering mollusks were fulfilled by Littorina, Trochus and Purpura. The small tank, containing these several organized members, was constructed of a zinc framing 3 feet in length, 1 foot in depth and 1 foot in breadth, having the bottom, ends and back filled with slate, and the front, or part towards the observer, glazed with plate glass, the whole being covered over loosely by a shade partially glazed, so as to impede the evaporation of the water, exclude as much as possible the soot and dust of the London atmosphere, while, at the same time, a continual change of air could take place. A quantity of rock-work was also introduced, and so arranged that the creatures could readily find a retreat, or screen themselves from the strong influence of the sun's rays during the day, and from the numbing effects of radiation in a clear night. A short and small shingle beach was also constructed at one extremity of the aquarium, to enable the various denizens to retreat to shallow water whenever they should be so inclined.

Into this vessel, thus arranged, several individuals of the common prawn were introduced during the months of October and November, 1852: they were fed every second or third day with small pieces of either oyster, mussel, cockle, shrimp, and the like, or, when these could not be obtained, with softened shreds of raw, lean meat, which had been previously dried by exposure to the air, in order to preserve it from putrefaction, and allow of its being kept as a store of provision capable of being had recourse to as occasion might require.

The manner in which these beautiful creatures take their food while foraging about the tank is very interesting. The first and second pair of didactylous feet are cautiously and continuously thrust into every

* Transactions of the Chemical Society, as published in their 'Quarterly Journal,' vol. iii. p. 52, 1850; 'Garden Companion,' January, 1852; 'Annals and Magazine of Natural History,' vol. x. p. 273, and vol. xii. p. 319.

cranny, around and partially under the pebbles and rock-work, and often into the tubes of Serpulæ or Sabellæ, or the shells of the univalve mollusks and others; and these, if not protected by an operculum or some provision for closing the orifice of their tube or shell, soon fall a prey to their attacks. When anything edible is met with, it is rapidly seized by these prehensile feet and transferred to the jaws.

The senses of touch and smell in the Palæmonidæ are exceedingly delicate, the latter appearing to reside most strongly in the antennæ. Thus, when a small particle of food has been dropped into the water and has sunk to the bottom, the moment the antennæ of the prawn in its movements pass across the column of water through which the food has fallen, the whole motion of the creature becomes changed in an instant, and it darts rapidly here and there, from the surface throughout the path of its transit until it is discovered; and often, after it has been devoured by the one, a second prawn will, on reaching the same locality, gain the scent and hunt over every spot in search of that which had been already removed, but which evidently had left its track of odour behind. It has very often occurred, that if some one of the Actiniæ had been first fed, the Palæmon, on gaining the scent, has tracked the food to the Actinia and speedily rifled it of its repast; and, in instances where the latter had even transferred its meal by means of its tentacula to its pouch, the prawn has redoubled its efforts, and frequently dragged the savoury morsel out of its very stomach. This operation it effects in a very surprising manner: the Palæmon charges, without any apparent fear, full on the extended disk of the Actinia, the tentacula of which it keeps in constant play by means of its three pairs of unarmed feet, while, at the same time, one of the second or larger pair of prehensile feet is thrust into the orifice of its maw, and the food forcibly and quickly extracted. The only chance the poor Actinia has of preventing this and securing its feast appears to be by contracting the whole of its tentacula together, and thus forming itself into a small globular form, so as to close entirely all approach to the orifice of its stomach. The energy with which this attack is effected depends very much on the keenness of the prawn's appetite, and, in cases where the Actinia is strong and also very hungry, the conflict is often very severe, and the aggression is sometimes, though rarely, successfully repelled.

The first pair of didactylous feet are slender and most delicate in their structure, and, when examined with a magnifying glass, are found to be provided at their extremities with a brush-like appendage

of short hairs standing out at right angles to the claw. The power of motion with which these are endued is most wonderful, and their usefulness is applied in every conceivable direction,—around the eyes, and among the apparently complicated apparatus of mandibles, antennæ and palpi, at the head, within or beneath the carapace, and for some distance between it and the body, particularly when the period of moulting is approaching; also for the cleansing of the abdominal false feet or swimming webs and the expanded lobes of the tail: and the appearance of the prawn during the execution of the brushing or scrubbing operation at these more distant parts is grotesque in the extreme; the body is supported and raised high on the four pair of legs, the abdominal part and tail being curved forward between them, so that the whole posterior division of the creature can be brought within the reach of the first pair of feet, and thus the necessary cleansing operation be readily effected.

When in full swimming action, the appearance of these beautifully transparent creatures is most elegant. The front feet are generally laid backward and tucked under the body, like the fore legs of the deer tribe in the act of leaping; the long and delicate antennæ stream gracefully on each side of its body, and float for some distance beyond its entire length, while its strong abdominal paddles propel it rapidly through the water. In the aquarium under consideration, the whole of these elegant creatures were in the habit, on the summer evenings, of careering to and fro for upwards of an hour's duration, close to the glass front of the case and towards the room, presenting a most pleasing object, and one which must be observed in order to be appreciated, as no description can convey an adequate idea of the interesting scene.

It is also a curious and striking phenomenon to observe these Palæmonidæ by the aid of a lighted candle or lamp in a dark room during the night, in consequence of the bright reflection of the luminous body from their prominent pedunculated eyes; and as the prawn does not retain a stationary position, but slowly roams about through the water and over the rock-work seeking for its food, it adds an increased interest to the appearance to behold these small globes of bright light, like the bull's-eye signal-lamps of a miniature railway engine looming through the distance in a dark night, moving slowly along, the body of the creature being quite imperceptible, and nothing visible but these pairs of globular balls of fire shining from out the dark water. Even the small eyes of an allied species, that remarkable little crustacean the Athanas nitescens, exhibit the same effect, although, from

their shy habits and diminutive size, it can be but rarely observed.

When the period arrives at which the Palæmon serratus is about to throw off its old external covering, it ceases to feed, and seeks about from spot to spot in a restless and fidgety manner, until it has fixed on a locality apparently sufficiently adapted for the purpose required and suited to its fancy; for this really appears at times to be the case. The third, fourth and fifth pairs of legs are then stretched out wide apart, and the feet hooked so as to hold firmly upon the surrounding substances, in such a way that the body may be poised and capable of moving freely in all directions, as though suspended on gimbals. The prawn then slowly sways itself to and fro, and from side to side, with strong muscular efforts, apparently for the purpose of loosening the whole surface of the body from the carapace; the two pair of prehensile or didactylous legs are at the same time kept raised from the ground, stretched forwards, and frequently passed over each other with a rubbing motion, as if to destroy any remaining adhesion; the eyes also may be observed to be moved within their covering by muscular contraction from side to side; and when every precaution appears to have been perfectly taken for the withdrawal of its body from its too limited habiliments, a fissure is observed to take place, between the carapace and the abdomen at the upper and back part, and the head, antennæ, legs, feet and all their appendages, are slowly and carefully drawn backward and out from the dorsal shield until the eyes are quite clear of the body-shell or carapace, and appear above the upper margin of it; the prawn thus half released then makes a sudden backward spring or jerk, and the whole of the exuvium is left behind, generally adhering by the shell of the six feet to the surface it had selected for its purpose.

A moment's consideration will develope to the contemplative mind what a truly wondrous process this act of exuviation really is. When we reflect on the small size of this crustacean, and the extreme delicacy and intricacy of its various organs, and then find that in this moulting the shell of the most minute and complicated of these structures is thrown off in a complete and unruptured state, even to the gauze-like membrane covering the projecting and pedicled eye, the filamentous antennæ, the many-jointed legs, the delicate didactylous hand, the paddled abdomen with its beautiful appendages, the palpi, and all the minute spines and microscopic hairs with which these various members are provided, the human mind can hardly appreciate

the wonderful wisdom of the Creative power that could have called into existence so marvellous an adaptation.

At the moment the prawn has been thus liberated from its old envelope, it rolls on the surface of the ground perfectly helpless, for it is at first, evidently, so soft that it does not possess the power of supporting its own weight erect upon its feet, while the beautifully delicate antennæ float from its head like gossamer threads through the water. In a short time, however, it plunges or springs, by a strong muscular exertion of the abdomen, from place to place, stretches its webbed tail and the large paddles of its swimming apparatus, and soon retreats into some dark and sheltered corner, where it remains, continually exercising its various organs, until such a period as the new investing membrane shall have become sufficiently hardened to allow of its venturing forth among its companions without danger, for during all this interval it is liable to their attacks whenever it comes near them, and is obliged by a series of forcible leaps rapidly to evade their attempts and escape out of their way. When the newly coated Palæmon first makes its exit from its hiding-place, its appearance is doubly beautiful; the colours are so clear and bright, particularly the orange and rich brown bands which encircle the pale blue prehensile feet, the various markings are so defined, and the small spines and fringes of hair so clean and well developed, and the deportment of the creature itself is altogether so bold and vain-glorious, as though proud of its new vesture, that it cannot but command the admiration it seems to seek.

It may be interesting to specify here the intervals of this moulting as they were observed during the summer of 1853. These periods were ascertained in the following manner. When the observations first commenced there were eight healthy prawns in the aquarium, and as each exuvium was cast off it was removed from the water and the date noted down, and by continuing this process the following results were obtained:—

May 25th, two cast skins were removed.
„ 29th, two „ „
„ 31st, one cast skin was removed.
June 5th, one „ „
„ 7th, two cast skins were removed.
„ 9th, two „ „
„ 12th, two „ „
„ 14th, two „ „
„ 16th, one cast skin was removed.

June 19th, one cast skin was removed.
„ 21st, one „ „
„ 26th, one „ „
„ 27th, one „ „
„ 28th, one „ „
„ 29th, one „ „
July 4th, one „ „
„ 9th, one „ „
„ 11th, one „ „

At this date four individuals were given to a friend, so that the number was reduced to four.

July 15th, one cast skin was removed.
„ 17th, one „ „
„ 18th, one „ „
„ 21st, one „ „
„ 30th, one „ „
August 3rd, one „ „
„ 4th, two cast skins were removed.
„ 12th, one of the prawns died during the moulting.
„ 14th, one cast skin was removed from the aquarium.
„ 21st, one „ „ „
September 2nd, one „ „ „

So that the period appears to vary from twelve to twenty-four days. This variation may depend upon the quantity of food taken by the respective individuals, and also on the varying temperature of the aquarium, which, from its small capacity and other circumstances, is very liable to be readily affected by the heat of the sun through the day, and the effects of radiation during a clear night. I may mention that, if these cast skins are not removed from the water, the prawns will devour all the smaller and softer parts, as the legs, the palpi, and the false or swimming feet, with great rapidity.

I hope in a future communication to add several observations on other varieties of the Palæmonidæ.

ROBERT WARINGTON.

Apothecaries' Hall, Blackfriars,
March 12, 1855.

A Record of some of the Effects of the late Severe Weather on Animals.—It is the opinion of Mr. Bell (Br. Quad. p. 306) that the longtailed field-mouse of English authors is the species which Ray terms Mus domesticus medius; but no reason is assigned why it should be called a domestic mouse. The late cold weather, however,

has explained any doubt that may have existed on the subject, by drawing them in considerable numbers into such houses as were accessible to them.

Water Shrew (*Sorex fodiens*). This is a common animal with us, and often meets the fate of the ordinary shrew (*Sorex tetragonurus*), in being left dead on the surface of the ground in summer: it is so rarely seen in the winter as to have led to the belief that it passes the cold season in a state of sleep; but in the last week in January, when there was a smart frost, and snow lay on the ground, two of them were found lying dead on the ground; and on the 1st of February, still severely cold, another was seen to be killed by a hen. They had probably been driven from the water by the frost, which had congealed the whole surface of the stream; but their plump condition showed that they did not die from want of food. In some notes which accompany my sketches of the organs of this creature I find the following remarks:—The three internal lobes of the ear, in their ordinary condition, are closed over the aperture; so that when the animal goes into the water none of the fluid can enter through the orifice: but at pleasure, or when alarmed, it can open the aperture widely, and thus it hears well; it is able also to open or throw back a portion of the tragus, by which means a blind sack is exposed, which guards the orifice of the ear from water, and yet allows of some degree of hearing. The auditory passage is directed downward and forward, and is wide for the size of the animal. The antitragus, by being placed a little backward, forms one side of the blind pouch, and at the same time constitutes a valve for the auditory passage.

The Wren. This little bird braves our hardest winters, but the manner in which it obtains protection from the cold has been little attended to by naturalists. Solitary as they usually are, they assemble and cluster together to obtain warmth. In one case, in the hole of a hedge where moss was in abundance, my informant found them assembled together in a ball as large as a quart measure; and in a short distance of each other were three or four of these clusters, containing together little short of a hundred wrens. In less numbers this clustering is not uncommon; and when the birds are seen acting thus it is supposed to foretel a cold night: they sometimes seek refuge in the hole of a tree, and prefer a haystack before a corn-mow. The wren has not suffered from want of food, as the Turdi have done severely.

Conger. Towards the end of February a ship from Cornwall, passing northward, came among a large quantity of congers which were floating on the surface, nearly but not altogether dead, and much inflated. A boat was sent out, which took up about 500 lbs. weight of them for food, and the largest was found to weigh 30 lbs. These fish were scattered over a wide space, and the men supposed they might have loaded their ship, if so inclined. I suppose the death of these fish to be less owing to the cold of the air than to the cold water, which a long continuance of N.E. winds had driven down from the German ocean.—*Jonathan Couch; Polperro, March* 6, 1855.

The Birds of London.—Many of the feathered race love the haunts of man, and build and breed near homesteads, despite of ill usage. The thrush and the blackbird are heard throughout the year in your shrubbery, and promenade at all times on your lawn; the titmouse rears its young in a hole in the garden-wall; while the pert note of the robin is heard in the walks, and his red breast is often seen on your window-sill. Even the magpie, the most wary and cunning of birds, often selects a tall tree near

the farm-yard wherein she may hatch and bring up her young. Country people laugh at our London sparrows, which abound everywhere, contrasting their plumage with the pert Passer of the barton. Every citizen knows that for years past a pair of rooks have built at the corner of Wood Street, nearly under the shade of Bow Church, while the crowns on the turrets of the Tower of London are occupied by these sable denizens every year: a considerable colony has long been settled in the large elms in Gray's Inn Gardens, from which they must have a real "bird's-eye view" of the hills that surround London. In a week or two the thrush may be heard in the gardens of Marlborough House: the recent severe weather has caused these birds to suffer in that quarter. Last week we saw a thrush, driven by hunger in quest of food, on the pavement at the back of the Athenæum Club. But we must return to the sparrows, London's sparrows, the most saucy of birds, as London urchins are the sauciest of boys:—starlings haunt Somerset House and the old buildings of the Temple; in the breeding-season they may be seen in the Temple Gardens, picking up worms and larvæ for their young broods: the sparrow attends as a gleaner to these birds, as the starling follows the rooks: as soon as the old starling has filled its crop and its beak to repletion, and is about to take its flight to its nest the sparrow watches his opportunity, and making a sudden spring snatches the redundant morsel from the beak of the old starling, and, quickly devouring it, looks out for another bird whom he may plunder in like manner. The reader may witness this feat a hundred times on a summer evening. It is curious, too, to see these same starlings feeding on the worms which showers invite from their holes: the bird darts upon the worm ere it has time to retreat, and, tugging with all its might, the mollusk is at length withdrawn, and the devourer, as he tears him from his hole, fairly tumbles heels over head! We have on more than one occasion noticed the hedgesparrow in the Temple Gardens during the autumn, a locality where ornithologists may scarcely expect to find such a bird. These remarks, it is scarcely necessary to add, apply to the more crowded districts of London, and not to the suburbs.—*J. Y. Akerman; Somerset House, March* 20, 1855.

Note on the Hawfinch.—During the late severe frost several of these singular birds were shot at Blofield, in this county, where some fine old yew trees in a garden seem to have had an irresistible attraction in a prolific crop of berries. The man who shot them gives the following account of their habits: they come, he says, "with a very rapid flight, and pitch into the yew trees like sparrows into the ivy; once there it is almost impossible to catch sight of them, as they keep amongst the thickest foliage." It was only by concealing himself that he could get a chance shot, as they rarely exposed themselves on an open branch, and on leaving the trees they again flew with great swiftness.—*H. Stevenson; Norwich, April* 17, 1855.

Extraordinary Hen's Egg.—Truly we live in an age of wonders; but I hope the oological wonder I have now to relate will not prove as hard of digestion as I fear the ornithological wonder related by Mr. Preston (Zool. 4661), concerning an "Auto-surgical Teal," will prove, even to the most enthusiastically credulous naturalist. The wonder I have to record was related to me a few days ago by the curate of the parish (Hooton Roberts, near Rotherham) in which the occurrence took place, and is as follows:—A hen belonging to a farmer in his parish having laid an egg of unusual dimensions, equalling in size a goose's egg, it was broken, with the idea of ascertaining if it contained, as is frequently the case, two yolks; but, to the good agriculturist's surprise, he found within this outer shell, and enveloped in albumen, a full-sized, perfect egg, with a strong, hard shell, but whether containing a yolk and white and a germi-

nating principle remains to be proved, as it has been preserved entire, I believe, for the purpose of incubation: the outer egg contained no yolk. I trust that if such an instance has ever before occurred within the knowledge of any of your readers or correspondents they will make it known. I have every reason to believe the accuracy of the facts as related, which, though perhaps not inexplicable, still appear to me unprecedented.—*O. Pickard-Cambridge; Durham, April* 17, 1855.

Supposed new Snipe.—For some years past I have occasionally met with a snipe in this neighbourhood, which I strongly suspect to be distinct from the common snipe, and not hitherto described. I think the first I observed was in 1834: it was sent to me by a gentleman who devoted himself at that time to snipe shooting, and who thought, from its superior size and its general dark tone of colour, that it was a different bird from the common snipe. Some little time afterwards I submitted my bird to Mr. Yarrell, and that gentleman informed me he had consulted some scientific ornithologists, and he believed, as well as themselves, that the bird was referrible to the common species, and that the greater depth of colouring might be attributed to summer plumage. I omitted to tell him when the bird was killed (about Christmas), but if I had done so he would not have suggested this cause for the variation of the plumage. Some five or six examples have since come to my notice, and I may remark that the size of the new bird is longer and more bulky than the common snipe. The whole of the tints of the upper plumage, both as to rufous and buff markings, are darker, and the longitudinal dorsal stripes are much narrower and appear altogether more obscure than in the Scolopax gallinago. There is also more rufous about the neck and shoulders, and the under parts are more darkly clouded, with the flanks much more striated and the belly less silvery white. Mr. Vingoe has been looking out for specimens during this hard winter, and succeeded in shooting one, which he says rose without any note and without any companions. All the specimens that I have seen correspond with each other: they all appear larger than the common snipe, but, like that bird, have fourteen tail feathers.—*Edward Hearle Rodd; Penzance, March* 24, 1855.

Curious Act of Auto-surgery in a Teal—Under this title a fact will be found recorded at p. 4661, by Mr. Preston (who, I learn, has no claim to the title of "Reverend"). When I read this I felt inclined to suppress it, having frequently observed a similar occurrence, and having always given it an entirely different explanation, believing that the curious juxtaposition of feather and bone was produced by the shot, without any contrivance on the part of the bird, and indeed much against its will and convenience. Still I felt reluctant to take a step that could have the appearance of discourtesy to a correspondent and observer of nature. I therefore printed the note, and now add my own theory on the subject.—*Edward Newman.*

Occurrence of the Smew near London.—On the 26th of February I shot a very fine specimen of the smew, at a distance of about seventy yards, between the White House and Temple Mills, near Lea Bridge.—*George Beresford; Lea Bridge, Clapton, March* 13, 1855.

Wild Fowl on the Norfolk Coast.—In my notice of winter visitors to this locality (Zool. 4660) I omitted to mention Smews, of which several have been shot; amongst them four males in perfect plumage. Within the last fortnight we have had in our market two adult Bewick's swans and two young ones, and four fine specimens of the castaneous duck have been lately obtained at Yarmouth.—*H. Stevenson; Norwich, April* 13, 1855.

PS. The word "scarce," in my last note, should certainly have been "some."—*H. S.*

Occurrence of the Iceland Gull and other Scarce Birds in the Neighbourhood of Plymouth.—The Iceland gull (*Larus leucopterus*) was killed by the Rev. R. A. Julian, January 30th, on the Laira. This species is far less frequent with us than Larus glaucus; indeed, the only other specimen I know of, obtained in this locality is in the collection of Dr. Moore of Plymouth, where it has been for many years. During the late severe weather some fine examples of the gadwall, goosander and smew have been obtained, also many bitterns. The cold appears to have had great effect upon the common heron, from the unusual quantity received for preservation by the taxidermists of Plymouth.—*John Gatcombe; Wyndham Place, Plymouth, March* 10, 1855.

Insensibility of Reptiles to Poisons.—In the 'Zoologist' a short time ago I met with an observation, which I cannot now put my hand upon, respecting the insensibility of reptiles to strong poisons. This reminded me that some years ago, when I used prussic acid in killing insects, I endeavoured by its means to destroy a common water newt; but, though several strong doses were administered, no effect seemed produced on the reptile. The acid was Scheele's, and kept well corked.—*George Guyon; Richmond, Surrey, April* 9, 1855.

An unnoticed character in the structure of the Fishing Frog or Angler.—On the 14th of April I obtained a very fine specimen of the angler (*Lophius piscatorius*), which was on the same day forwarded alive to the Gardens of the Zoological Society. It was taken on the ebbing of the tide at 8 A.M., and was kept in a pool of water until 3 P.M., at which hour it was packed and dispatched. I would draw the attention of naturalists to a fact I have not seen hitherto mentioned, which is this; when looking down on the fish, the whole of the outline of the head and also the body carries little leaflets which are in constant motion. In all the drawings I have seen appendages only appear around the anterior part of the head, and these are represented as cirrhi. This is not the case; the appendages are carried round the body quite to the commencement of the caudal, and do not differ from each other, excepting in size; these are mostly ¾ths of an inch in length, nearly flat, and all shaped like an oak-leaf; they are very regular in their shape: these are, doubtless, from their constant motion, used to entice prey.—*William Thompson; Weymouth, April* 22, 1855.

Curious Habit of the Fringed-lipped Lamprey.—My friend Mr. Coombs, the Mayor of Dorchester, has lately found the fringed-lipped lamprey (*Petromyzon Planeri*) in great quantities in the river Frome, close to Dorchester. I had noticed two about a fortnight since, and was much amused at their proceedings: they were in a small rivulet near the County Gaol: I watched them for nearly an hour, during which time they were constantly employed in removing stones, and this evidently in their search for food. Their mode of proeeeding was to attach themselves to the stone, and then by wriggling their bodies to detach it from its bed, and then, making a spring for about eighteen inches, they dropped the stone; they never made a second dart with the same stone: on dropping the stone, they immediately returned to the spot from which they had taken it and nozzled for some time in the mud and sand, leaving me to infer they were searching for food: they certainly were not making a nest, as they never dropped

two stones in the same place; they carried the stones up the stream, and appeared to drop them when the strength of the springing forward was exhausted. We thus see an admirable adaptation of the mouth of the lamprey to its habits; it doubtless feeds, exclusively, on the minute animals which are found in abundance under all the stones. —*Id.*

Gonepteryx Rhamni double-brooded.— The Rev. Mr. Hawker (Zool. 4650), in noticing the occurrence of Rhamni, adds, without further comment, the expression "double-brooded." Now, I think no one ever had more opportunities of making the acquaintance of this butterfly than I have. I have seen it on new year's day and almost every succeeding day in the year, on Christmas-day most certainly, and have taken careful note of its condition, and my conviction—my firm conviction—has been that there is but one (an autumnal) brood during the year, and I shall feel extremely obliged if Mr. Hawker will detail the particulars of the interesting and important discovery he has made. I may add, that I have spoken on the subject to Mr. Doubleday and other eminent Lepidopterists, to which title I lay no claim, and I find the discovery is as new to them as to myself.—*Edward Newman.*

Proceedings of Societies.

Entomological Society.

April 2, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Abhandlungen der Mathematisch-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften,' Vol. xvii. Part 2; 'Bulletin der Königlich Akademie der Wissenschaften,' Nos. 1—52, 1853; 'Ueber das Klima von München,' von Karl Kuhn; by the Academy. 'The Literary Gazette' for March; by the Editor. 'Journal of the Society of Arts' for March; 'Catalogue of the Seventh Exhibition of Inventions;' both by the Society of Arts. 'Proceedings of the Royal Society,' Vol. vii. Nos. 9 and 10; by the Society. 'The Zoologist' for April; by the Editor. 'Proceedings of the Berwickshire Naturalist's Club,' Vol. iii. No. 5; by the Club. 'The Entomologist's Annual for 1855,' 2nd Edition; by the Editor. Hewitson's 'Exotic Butterflies,' Part 14; by W. W. Saunders, Esq. 'Entomologische Zeitung,' 1855, Nos. 1 and 2; by the Entomological Society of Stettin. Fifty-two specimens of British Lepidoptera; by H. Doubleday, Esq.

Distribution of the Society's Duplicate Insects.

The Secretary announced that the Council had determined to distribute among the Members the duplicate specimens in the Society's collection of British Coleoptera, Exotic Coleoptera and Exotic Diurnal Lepidoptera; and that, in order to give the country Members an opportunity of selection, the distribution would not take place

until after the June meeting. The Council did not make any condition of exchange, but they hoped the Members would, in return, contribute as far as they were able the desiderata to the Society's collection.

Proposed Catalogue of British Coleoptera.

The Secretary also said he was happy to announce that the offer of Dr. Gray for a Synonymic Catalogue of British Coleoptera had been accepted by our Curator, Mr. Janson, who would be glad to receive any information and assistance from his brother Coleopterists in the work he had undertaken. The first part of the Catalogue would be ready in about two months, and it was also Mr. Janson's intention eventually to print a Nomenclature of the Species, for interchange among collectors.

Exhibitions.

Mr. Foxcroft sent for exhibition specimens of several species of Lepidoptera, recently reared by him from larvæ collected in Fifeshire; a pair of each species would be given to each of his subscribers for Lepidoptera: also two specimens of Papilio Machaon, with the skins of the chrysalides from which they came: both insects and pupæ, he said in a note, presented certain constant differences of marking divisible into two kinds, of each of which he had reared males and females.

Mr. Bond exhibited a Phragmatobia lubricipeda, presenting an agglomeration of the dark spots on the costa into a continuous line, and also some other variations of marking. This specimen was reared by Mr. Foxcroft.

Mr. Stevens exhibited, from the collection of Madame Pfeiffer, a pair of the rare beetle Euchirus longimanus.

Greasiness of Insects.

Mr. Stainton exhibited two specimens of Nepticula Acetosæ, pinned last summer, which already showed signs of verdigris on the pins.

Mr. Edward Sheppard exhibited four specimens of a Donacia, two of which were mounted on gilt and two on ungilt pins. They were all pinned at the same time, four months ago, and the gilt pins exhibited no trace of verdigris, but the ungilt pins were surrounded with it.

Mr. Edwin Shepherd repeated his former remark, that after the lapse of a year or more he had found pins doubly gilt were affected by the greasiness of the insects equally with ungilt pins.

Description of a New Ornithoptera.

Mr. Stevens read a description, by Mr. Wallace, of a new butterfly taken by him on the N. W. coast of Borneo, under the name of Ornithoptera Brookiana, of which a drawing was exhibited.

Tropical Micro-Lepidoptera.

Mr. Stevens read an extract from a letter received from Mr. Wallace, in Borneo, in which he stated that he had taken about 700 Micro-Lepidoptera, among which are some extraordinary developments of palpi, &c. He finds these small moths come in abundance to a lamp, on dark, wet nights, and in the wet season he is sure he could get thousands of them.

The President read the following note:—

On the Galls produced by Cynips Quercus-petioli.

"When, at the last Meeting of the Society, I presented my observations upon various galls from the Crimea, lately published in the 'Gardener's Chronicle,' I had no opportunity of referring to the oak-galls which have been several times exhibited to the Members under different names.

"It is, however, most important that the name of the species should be determined; I therefore investigated the subject carefully, and am satisfied that I was correct in the opinion I first gave. It may be remembered that when the galls, with the fly, from Mr. Walcott, were laid before the Society by me, and also by Mr. Rich, I stated they were identical with the Cynips Quercus-petioli of Linneus, but this opinion was objected to by Mr. Newman, owing to the galls not being apparently produced from the petioles.

"On referring to Linneus's 'Fauna Suecica,' p. 387, I find he writes of Cynips Quercus-petioli, 'Habitat in Galla utrinque convexa inflata, petioli seu ramuli Quercus,' showing that the galls are not confined to one spot, and he refers to Roësel's Ins. App. t. 35, 36, which volume I had obtained of Mr. Janson at the last Meeting, in order to exhibit the excellent plate of the galls there given, together with the imago, which agrees well with the females bred by Mr. Walcott, at once identifying the galls and insects which I exhibited last November with the Cynips Quercus-petioli of Linneus, and likewise with Reaumur's fig. 7, pl. 41, vol. iii., which evidently represents the galls of the same species of Cynips.

"I would also observe that the 'Galle en pomme,' represented in the same plate by Reaumur, and formed by the Cynips Quercus-terminalis, is so totally different from the galls of the C. Quercus-petioli in the internal structure, as well as in their position on the twigs of the oak, that they must be the productions of very different species.

"Since the above memoranda were written I see Mr. Westwood has given, in the 'Gardener's Chronicle,' an Essay on the British Ink-Galls, with figures of the oak-gall and the Cynips from Devon; and I am glad to learn he intends to investigate still further the galls of commerce. It is possible they may not be found so valuable, in a commercial point of view, as they were formerly, owing to the galls being superseded by metallic ingredients in the manufacture of ink; nevertheless they may still be serviceable in furnishing a permanent dye."

Mr. Westwood said he had very recently found his specimens of the Cynips, which he had determined to be the C. Quercus-petioli so long ago that the ink with which the name was written on the label had faded.

Duration of Life in the Honey-Bee.

Read, "Observations on the Honey-Bee, in continuation of the Prize Essay of the Entomological Society for 1852;" by J. G. Desborough, Esq.

Mr. Wollaston's Collection of Madeira Insects.

Dr. Gray said it might be interesting to the Members to know that Mr. Wollaston had transferred to the British Museum his collection of Madeira Insects.—*J. W. D.*

On the Food of certain Gregarious Fishes.

By R. Knox, M.D., F.R.S.E., &c.*

At an early period of my inquiries into the natural history of the Salmonidæ, I was much struck with the difficulty there seemed to be of arriving at the truth in a matter so simple in appearance as the determination of the food on which certain interesting gregarious fishes live and thrive. The conflict of opinions on this point which then existed, and strange to say still exists, induced me to devote a good deal of attention to it; and as I find my views still opposed to many, and especially to those of my esteemed and distinguished friend M. Valenciennes, I have thought it might serve the cause of science and of truth to submit a memoir on the subject to a society, venerable as well by its name as by the services it has rendered the sciences of observation.

The inquiries, of which the results are merely given here, were commenced about 1824, or about thirty years ago; and although I have repeated them on many occasions, I do not find it necessary to alter or modify the statements originally made on this point to the Royal Society of Edinburgh, in whose 'Transactions' a mere notice of my researches and observations were published.

My attention was first directed to the fact, for such it is beyond a doubt, that in the stomachs and intestines of fresh-run salmon, that is, of salmon fresh from their best, indeed their only true feeding-ground, the unknown recesses of the ocean, nothing is ever found but a peculiar reddish substance (and that in small quantity), unlike anything known to possess life. The reddish coloured matter is also found in the intestine. On applying to practical fishermen, that is, to those who had seen, I shall not say examined, hundreds of salmon opened and gutted, I found that they had but one opinion on the subject, namely, that the food of the salmon, whilst a resident in the ocean, was altogether unknown.

On inquiring of the same class of persons as to their knowledge of the food of the herring, I found them equally at fault. They spoke vaguely about the herring living by suction, but they were agreed as to the main fact, namely, that food discernible to the naked eye was rarely to be found in the stomach of the herring. Whilst reflecting on

* Read December 19th, 1854, to the Linnean Society. Communicated to the Linnean Society by William Yarrell, Esq., V.P.L.S.

these circumstances, so singular in the natural history of fishes playing an important part in the economic history of Great Britain, Holland, and the Scandinavian nations, I learned accidentally that in South Scotland, in a lake or lakes near Lochmaben, there was, in great abundance, a small gregarious fish, which could not be tempted by any bait, and whose food was entirely unknown. These lakes, of various extent and depth, are situated at no great distance from the river Annan, with which they all communicate directly or indirectly, but not all with each other; they contain many kind of fish, as the vendace, of whose food I am about to speak, which are not found in the river Annan; neither am I aware that the salmon and sea trout, which, at certain seasons, abound in the river, make their way into these lakes. Thus many curious questions are opened up for the consideration of the philosophic naturalist. The jack or pike abounds in the Castle Loch, and yet has not destroyed the vendace, a fish not found, so far as I know, in any other part of Britain. With the food of this fish, the vendace, I resolved to commence the inquiry. Confined to certain lakes, and never quitting these, abiding in waters which I could command with the net, the property of gentlemen whom I had the pleasure to call my friends, I felt that the inquiry ought to commence there. The facts, moreover, were reported as being, *without exception*, an important point in every physical inquiry. Far otherwise, I saw, would be the inquiry into the food of the herring and salmon; questions surrounded by numerous difficulties, and overlaid with prejudices, extending even to the naturalist.

The mass of mankind love mystery now, as they once did anything which bore the semblance of a miracle. This foolish and silly passion can only be met and stemmed by philosophy, by science. The case between the lovers of mysterious untruths and truth-seeking science has been well stated lately by the illustrious Faraday. In the matter of the food of the vendace of Lochmaben, a gregarious fish, now arranged by naturalists with the Corregoni, I found, on reaching the village of Lochmaben and its pleasing lakes, many vague and mysterious stories afloat as to the vendace, which even naturalists had taken the trouble to repeat. One forenoon's inquiry destroyed the whole illusion or delusion. Dozens of the vendace were opened immediately on being removed from the lake, by means of nets, for they are not to be caught in any other way: on their stomachs being examined they were found to be crammed with thousands of Entomostraca, or microscopic shrimps as they may be called, the class of microscopic shell-fish so beautifully described by Müller. The solu-

tion of the mystery depended simply on the placing a portion of the contents of the stomach under a strong lens, which I took care to be provided with. Strange as it may seem, nevertheless, the fact is certain, and now I believe admitted by all, that no one had ever thought of this before.

The species of the Entomostraca first discovered belonged to the genus Lynceus, but several other genera were observed; and in winter (14th December, 1832, for I had the lakes fished expressly for this inquiry), the Cyclops of Müller of several species most abounded. Thus, instead of living on air and water, the vendace consumes daily, no doubt, thousands of shell-fish, a highly nutritive food; the roe of these Entomostraca, being swallowed with the parent, contributing to render the food still more nutritious.

The mystery was now at an end. I have sometimes thought that the villagers were not over well pleased at so simple a solution of what they had so pleasantly and so frequently discussed. A dissenting clergyman of the place wrote an article against my views, or rather against myself, which article was published in a work * so replete with error as to stand, I believe, unparalled in the history of compilations. Another parson,† a man of common sense and fond of science, recommended the dissenter to see me *first*, and examine with me *the food* of the vendace, for himself; in other words, "to test the fact by an appeal to the materials." This he declined doing, for reasons I need not state. The contempt of the class I speak of for physical truths is extreme, but this lamentable frailty, so detrimental to the best interests of mankind, does not fortunately extend to all theologians.

This unlooked for discovery opened up at once a vast field of inquiry; in fact I commenced with the vendace knowing the difficulties which awaited its extension to some other gregarious fishes larger than the vendace, that is, the herring, the early spring trout of Loch Leven, and the char.

Before proceeding to these, I shall allude to several facts made out as to the natural history of the vendace, facts ascertained during the course of frequent journeys to Lochmaben; they may be useful to the naturalist who may hereafter more fully describe the Corregoni. The notion that, like the herring, the vendace dies immediately on being removed from the lake was disproved at once, by bringing them to the

* 'The Statistical Account of Scotland.' Blackwood.

† Dr. Macknight.

village in buckets of water: it is by no means a very delicate fish, and could easily be transplanted to other lakes; but it is not a high-seasoned fish, and in this respect also what has been said of its singularly good qualities is a pure exaggeration. The object of science is to destroy mystery and popular delusions.

Mr. Harkness, of Lochmaben, who assisted me greatly in these inquiries, had the kindness to have the vendace caught for me in the depth of winter, that is, on the 16th of December. The rivers Annan and Æ were fished for me on the same day for parr, and specimens of both were sent me. There were twenty-four vendace; of these twenty-two were females and two males; they were taken in the Castle Loch of Lochmaben, as usual with the net. In nineteen of the female vendace the ovaries were small, very soft, and the ova mere points; but the fish themselves were in good condition: in three females the ova were very large, and the fish just about to spawn; in the two males the milts were progressing in size, but not much enlarged.

The vendace is found in two of the system of lakes near Lochmaben, namely, the Castle Loch, so called from the ruined castle of the Brus on its banks, and the Mill Loch: this latter is a deeper loch, but not so extensive. As it seemed to me that the vendace of the two lakes differed somewhat from each other, my brother, at my request, examined them very carefully; the result of that inquiry is as follows:—

Examination of the Vendace of the Castle Loch and Mill Loch, February 26, 1837.

"The mouth being fully closed, and the specimen laid on a flat board, the following dimensions were taken:—

	Castle Loch.	Mill Loch.
Snout to centre of tail	$6\frac{3}{4}$ inches.	$6\frac{3}{4}$ inches.
„ dorsal fin	3 „	3 „
„ mort fin	$5\frac{1}{8}$ „	$5\frac{1}{8}$ „
„ pelvic fin	3 „	3 „
„ anal fin	$4\frac{3}{4}$ „	$4\frac{3}{4}$ „
„ extremity of gill-covers	$1\frac{3}{8}$ „	$1\frac{1}{2}$ „
Breadth of eye	$\frac{3}{8}$ „	$\frac{3}{8}$ „
Length of head, dorsal line	$1\frac{1}{16}$ „	$1\frac{1}{8}$ „
Greatest depth of body	$1\frac{5}{8}$ „	$1\frac{3}{4}$ „
	oz. drs. grs.	oz. drs. grs.
Weight	1 5 40	1 9 40

"Lateral line precisely mesial in the Castle Loch vendace, but one-eighth nearer the dorsal line than the abdominal line in the Mill Loch.

"A section shows both these specimens to be female, with the ovary more fully developed in the Mill Loch vendace; the liver is evidently larger in the vendace of the Mill Loch: these differences, however, will not account for the great additional weight of 4 drs., and which evidently arises from the greater depth and thickness of the Mill Loch vendace. This greater depth and thickness of the body, and the larger head, seems to me to constitute the only specific differences between these two fishes. The difference in colour is very striking; but this seem to me to depend on the greater number of minute black spots of the rete mucosum in the Mill Loch vendace: the dark shade is so strong on the head as to obscure almost, if not entirely, the brain; and thus the peculiar and much-dwelt-on heart appearance observed in the Castle Loch vendace is not seen in that of the Mill Loch. The scales, which I took from the lateral line and near it, of both specimens present precisely the same appearance when placed under the microscope: I counted 30 rays on that part of the scale, in both specimens, which is exposed: the number of rings on the part concealed by the superimposed scale is greatly more."

The largest vendace I have ever seen was 9 inches in length.

Another delusion in respect of the vendace was the supposition that the males lived apart from the females in deeper water, and hence beyond the reach of the net. Like everything else in the history of the fish this also seemed a delusion; for the net being drawn in the Castle Loch of Lochmaben, and near the castle, in presence of Mr. Murray and myself, of fifteen vendace which I examined nine were females and six males: this was in October. Nevertheless, I feel disposed to think that the males are not so numerous as the females, for of forty taken in the Mill Loch at one time only two were males. The males are lighter coloured than the females.

(Thus terminated a popular delusion which had no doubt maintained its ground for centuries. The discovery of the food of the vendace, and of countless millions of other fishes to be spoken of immediately, was a gift of the microscope to science: it illustrates and perhaps explains many obscure points in the natural history of such fishes, and may one day lead to important results.—*Added to the original MSS. April* 20, 1855.)

The Food of the Char.

Having thus successfully solved the problem as to the food of the vendace, and removed all doubts from even the most prejudiced, I next turned my attention to that of the char. Some fine specimens were obtained from Windermere, and the food, which proved to be the Entomostraca, with which the lakes abound, was exhibited to the Royal Society of Edinburgh. The char is a gregarious, deep-swimming fish, shy of taking any bait; nevertheless, it will rise to a fly, and the common food of the trout may be found in its stomach, although I have not found it to be so; nevertheless, it does not seem to me to feed exclusively on the Entomostraca, although these unquestionably form by far the larger portion of its natural food.

The observations as to the food of the char were repeated several times, and always with the same results.

(The disappearance of the char from many lakes in Scotland, as for example, from the lake of Leven, may be connected with circumstances dependent on the natural history of the Entomostraca, which, no doubt, form its natural food.—*Added to the original MSS. April* 20, 1855.)

The Early Spring or Gray Trout of Loch Leven.

I had remarked many years ago that certain trout of Loch Leven come into season much earlier than others; that there were some, in fact, which were in the highest condition in the end of December, January, February and March, a period of the year in which all other descriptions of trout are worthless as food for man. I at first conjectured that this peculiarity might depend on a specific distinction, and I am still disposed to believe that in Loch Leven there are two distinct species of lake trout, an early fish and a late one, but anatomical investigation has not as yet borne out this view. But be this as it may, the facts remained simply as they were,—namely, that an admirable sort of trout comes into perfect condition in Loch Leven as early as December and January; and then came the question of its food.

In January, 1832 or 1833, I requested two friends* to be present at

* The late Mr. William Murray, of Henderland, and Mr. Graham, of Redgorton, nephew to Lord Lynddoch.

the examination of *four* specimens of very fine Loch Leven trout, purchased in the market that morning. On their stomachs being laid open and examined with a lens, they were found to be filled with Entomostraca; and these I have always found to constitute the food of the early spring trout of Loch Leven.

During the remainder of the year the ordinary Loch Leven trout live on the small Buccinum and the common food of trout, with which the lake abounds: they rise readily at an artificial fly, and may, no doubt, be taken with worms or minnows, or any of the ordinary bait for trout.

It has been asserted, since these discoveries were made, that the Entomostraca form the staple food of most of the finer sorts of lake trout. I believe the statement to be very probably correct, but I have not myself had an opportunity of verifying the fact. Those who doubted all these facts at first went soon afterwards, on finding they could not be refuted, into the opposite extreme, and asserted that the Entomostraca, of which, by-the-bye, they had no very clear idea, formed the most nourishing food of fishes. I lay no claim to such sweeping generalizations, being simply contented with what I can prove by demonstration.

The Herring.

Having thus cleared the way, as it were, of some of the obstacles to the successful prosecution of the inquiry, I next proceeded with that of the food of the herring. The difficulty was to obtain the herring from the deep sea, in fine order and as remote as possible from its spawning condition. When found near the coasts, the herring is either about to spawn or has already spawned: it is, to a certain extent more or less, a foul fish, and the food it may take at that time is not to be held to be its natural food; this can only be made out in the herring when in the finest order and in the deep sea, to which he seems annually to retire. This part of the inquiry was accompanied by a good deal of trouble and considerable expense: the herring had to be examined on both coasts of Scotland, and indeed under a variety of circumstances.

Of the hundreds and hundreds of herrings I have examined, with this view, I remember but a very few in whose stomachs anything was found excepting Entomostraca of various species. Of the specimens to which I allude as having been feeding on other prey, one had

been living on sand-eels; another on what appeared to be small herrings; and in the stomach of the third were the shells of about a dozen small Buccinums. These were the only specimens out of hundreds in which the Entomostraca did not form the sole food. I leave the negative and positive evidence to speak for themselves. The positive evidence I at last obtained on this curious point would fill a volume.

Throughout the inquiry, which was prolonged for several years, my great object was to obtain the herring at as great a distance from the shores as possible and in the best order. The British herring-fisheries are in reality shore-fisheries, or nearly so, and the herrings are most frequently taken on the spawning-ground, and in a condition when the fish do not feed. Notwithstanding these innumerable difficulties, it seems to me that I have succeeded in determining, beyond all doubt, the food of the herring to consist of various species of Entomostraca, with which it is known the seas and bays abound.

When near the coast the herring is frequently not feeding. Thus, in the Forth, in January and February, 1836, I examined the stomachs and intestines of a very great number of fresh herrings, taken in the Frith of Forth, and found them empty. The roes and milts were large, but not remarkably so. On the other hand, after spawning, and whilst close to the shores, they seem to take to other food, as sand-eels and shrimps. I find in June, 1831, that herrings taken off Dunbar were in this state; the stomach and intestines loaded with putrescence; the fish worthless and insipid. My journals of observations, made by my brother and myself, at every season of the year and on both coasts, are now before me: they confirm the facts, already well-established by practical men, that shore-fisheries of fish whose habitat is the deep sea seldom produce fish in their prime condition. The deep sea cod and haddock, as compared with the same fish caught high in estuaries, furnish a good example of this truth; the herring another. Thus, in the Frith of Forth fishings of the 20th of July, 1834, five male herrings, taken at random from a large number, were found to have the milts small; they had been feeding on the Entomostraca alone: these herrings proved of good flavour and were excellent to eat: thirty others of the same take were found to be insipid and worthless. Of these some had been living on sand-eels as well as Entomostraca; their stomachs and intestines were full of putrescent remains. Thus food, as well as their approach to

the spawning or recently spawned state, exercises a striking influence on the quality of certain fishes as food for man.

In August some fine herrings were examined in Glasgow (west coast of Scotland); the food appeared to be the ova of some testaceous animal, as the shrimp, but after all, was probably merely Entomostraca, exceedingly minute: nevertheless, a few even of these herrings had been eating the sand-eel. On this coast also, as the herrings get out of order, they take to other food and become insipid and worthless. These observations were repeated on September 27th and October 13th, 1834, at Anstruther, in Fife, and close to the mouth of the Frith of Forth. Of fifteen herrings taken on July 6th, 1838, of three different sizes, the stomachs were filled with Entomostraca: the first were in good order as food. But in winter, in friths, they do not seem to feed; as on February 6th, 1836, of many fresh herrings caught in the Frith of Forth, the stomachs and intestines were found to be empty.

Of fifty herrings examined on the 13th of February, 1836, caught in the Frith of Forth, forty-two had the stomachs and intestines empty; four had been feeding on the ova of small fishes, and four on a peculiar red substance: in twenty-two others nothing was found. Thus, when caught in bays and friths, the stomach is often quite empty; like the salmon, they are then off their feeding-ground, which is the deep sea. The sexes are usually in equal numbers. On the 30th of November, 1834, my brother remarks, in his journal, that it has been invariably in herrings caught off the Isle of May that he has found the Entomostraca: further up the frith, their stomachs are very generally empty. The Isle of May is close to the German Ocean. On the 4th of December, some herrings taken even now are good; and this, my brother remarks, is invariably the case with the first taken—even in winter.

Continuing the examination of these original journals, I find the following entries:—

"July 6, 1838. Fifteen herrings, taken off Anstruther and dissected, gave the following results; the date of capture as above.

Largest size.—From snout to centre of tail . . .	$10\frac{3}{8}$	inches.
Length to dorsal fin	$5\frac{1}{8}$	„
„ to extreme margin of gills . .	$2\frac{1}{8}$	„
Greatest depth	$2\frac{3}{8}$	„
Weight	8	oz.

Middle size.—Measured as above	. . . . .	$8\frac{5}{8}$ inches.
Ditto „	. . . . .	$4\frac{1}{8}$ „
Ditto „	. . . . .	$1\frac{3}{4}$ „
Ditto „	. . . . .	$1\frac{7}{8}$ „
Smallest size.—Measured as above	. . . . .	$7\frac{1}{4}$ „
Ditto „	. . . . .	$3\frac{5}{8}$ „
Ditto „	. . . . .	$1\frac{1}{2}$ „
Ditto „	. . . . .	$1\frac{5}{8}$ „

"The results of the dissection of these three sorts were as follows:—

"1st examined, was in good order, fat; a male: milt small; 3 inches long by $\frac{1}{4}$ inch broad: food Entomostraca.

"2nd, a male; in most respects as preceding: food Entomostraca.

"3rd, a male; as above: stomach empty; intestines clean and quite empty.

"4th, in fine order, as above; a male: food Entomostraca.

"5th, a female; in all other respects as those already examined: food, 1st, Entomostraca, abundant, minute; 2nd, two small prawns.

"6th, a female; in other respects as above: food Entomostraca, of two kinds; one extremely minute.

"7th, a female; the fish in the highest order: food Entomostraca.

"8th, a male, $9\frac{1}{2}$ inches long: milt longer than in those described; 4 inches long by $\frac{1}{2}$ inch broad: food Entomostraca.

"9th, a male; as in the first seven: food Entomostraca.

"10th, a female; in the best order: food Entomostraca.

"11th, ditto; ditto: food Entomostraca, of a large species and greenish colour.

"12th, length 7 inches; of very inferior quality, soft; seemingly a young fish, yet tolerably fleshy; a female: food Entomostraca.

"The 13th, 14th and 15th specimens were in as good condition seemingly as those described, but although taken early this morning the viscera by 5 P.M. were found to be putrescent: food Entomostraca.

"Thus, the quality as to food of the natural family of the Clupea depends—1st, on species; 2nd, on their food; 3rd, on their condition as to the state of the milt and roe. Their natural habitat is the deep sea, where they find their natural food—the Entomostraca."

Lastly, I availed myself of the assistance of my much esteemed friend and former student Mr. Henry D. Goodsir, now, alas! with Sir John Franklin. This gentleman with his more celebrated brother, Mr. John Goodsir, were my favourite students and assistants in my comparative anatomical pursuits, in consequence of their fondness for such

studies. Their family resided at Anstruther, a great fishing station on the Frith of Forth, and I wrote to Mr. Henry D. Goodsir to push the inquiry for me to the utmost: this he did by embarking in the fishing-boats himself on the stormy frith, and proceeding with the fishermen to the fishing-ground, not far from the Isle of May, and in the open sea. He wrote me two letters in answer to my inquiries, one of which, I fear, has been lost; I transcribe a copy of the second; of its value I need say nothing:—

Copy of Mr. Goodsir's Letter respecting the Food of the Herring.

"Anstruther, June 15, 1843.

"My dear Sir,—I have put off thus long in answering your letter of the 29th ult. for the purpose of making further observations on the herring and its food, and find that my previous observations are quite correct in regard to the matter. I will now, then, answer your queries separately.

"1st. The Entomostraca are at certain seasons the almost exclusive food of the herring: there can be no doubt, either, that they follow shoals of these Crustacea to prey upon them, for it is only when the latter make their appearance on this coast that the former are seen; and when their food is most plentiful the herring are in best condition. It is during the summer months also that we find the larvæ of the more common species of Decapoda, along with those of Balani, and occasionally a minute shell-fish, amongst the contents of the stomach.

"2nd. It appears to be chiefly during the winter and spring months that the herring take other kinds of food than the Entomostraca; during these months, however, we find the stomach oftener empty, and only occasionally filled with the larger Crustacea, such as the shrimps, &c.; in other cases with Entomostraca.

"3rd. As to Entomostraca being the partial or exclusive food of other fish besides the herring, there can be no doubt that during the summer months, when the shoals of Entomostraca, or what our fishermen term *maidre*, are in great abundance, they form the food of a great number of other animals besides the herring. The common coal fish is perhaps the species which, next to the herring, preys on the *maidre* in greatest number, and is consequently often caught in large quantities in the nets during the early part of the season.

"It appears to me also that the shoals of Cetacea which make their appearance in the frith during the herring season are in pursuit of the *maidre*, and not of the herring, as is most generally thought to be the case.

"If you are aware of any other points which would require observation, be so good as let me know.

"Believe me most sincerely yours,

(Signed) "H. D. Goodsir.

"To Dr. Knox."

Thus, after the lapse of nearly twenty years, a student of my own, favoured by his position, confirms, to an extent I had scarcely hoped for, my original observations on the food of the herring. I call the attention of naturalists, and especially of my esteemed friend M. Valenciennes, to these *facts*. As regards man, they are the most important which, next to the capture of the herring, can be brought forward in respect of the natural history of the herring; and they explain certain economic statistics bearing on the great fisheries of Holland, which otherwise were wholly unintelligible. The naval power of the ancient republic of Holland was created and based on a deep-sea herring fishery; the modern herring fisheries of France, England and the Scandinavian States are shore and boat fisheries, of little value as a food-producing employment, and of no value whatever in a naval point of view.

Prior to these researches the difficulty of discovering the food of the herring was proverbial, and had been declared such by all. Soon after my discovery of the food of the vendace, I spoke with that true patriot and most amiable and talented man, the late Sir John Sinclair, on the subject, and he informed me that he had often turned the matter over in his mind, but without coming to any definite conclusions: he put into my hand a pamphlet, by the late Sir Gilbert Blane, entitled 'Reflections on the Present Crisis of Public Affairs,' dated 1831, pointing out to me the following passage:—"There are few problems of Nature in the solution of which naturalists are more at fault than the disposal and *nutrition* of the finny family. It is proverbially true that they prey upon each other; but it is so much even beyond conjecture to ascertain what is the ultimate food of fish, that it is the tenet and belief of some of the most respectable inquirers into this department of Nature, that the last fishes which those next above them make their food have no sustenance but water. The phenomenon of the immense shoals of herrings, and the fact of gold and silver fishes living without any visible food, are some of the grounds upon which they found their doctrine." When I removed from the stomachs of the herring, the vendace, the char and the Loch Leven trout, hundreds of Entomostraca, in the presence of this excellent nobleman, and, placing them under a microscope, convinced him that the popular belief that all or any of these

admirable fishes lived by or on suction, or on water merely, or on nothing, as some would have us believe, was unfounded, he was greatly surprised and pleased. Thus was this most difficult problem solved at last. I am aware that there are some, but still, I hope, for the honour of my countrymen, few, who say that the solving such a problem as this is a perfectly simple matter—of no value in science, and scarcely meriting notice; yet strange to say that, in respect of all the fishes enumerated, amongst which we may include the salmon, the problem had avowedly remained unsolved from the earliest recorded period until that of my own investigations. It would seem also that Dr. M'Cullagh gave an early attention to this matter, and conjectured that the herring preyed on the Medusæ; but he made no inquiries into the subject. Lastly, it has been asserted that Leuwenhock had detected Entomostraca in the stomach of the herring. There is not a single passage in the Memoirs of this celebrated observer furnishing the smallest hint for the belief that he ever detected the Entomostraca in the stomach of the herring, and his remarks are as follow:—"After much turning this matter in my thoughts, I had a fancy to know what is the food of this fish (the herring); and for that purpose I inquired of many men used to this fishing, what food they generally found in the stomachs of herrings when first caught, but the constant answer I got from them was that they never found any. At length I met with a merchant who fits out ships for the herring fishery, and from him I learned that in a certain tract of sea near the coast of Scotland herrings are caught, in the stomachs of which are found some kinds of small fishes, but that those herrings will not keep long." "Not content with this," continues Leuwenhock, "I determined to wait for the season when certain herrings are brought to our town, which, as I have heard, are caught in great numbers not far from Amsterdam."

Thus it would appear that to practical men, fishermen, merchants, Dutchmen, who turned over millions of florins and guilders annually from this great staple, the food of that fish by which they lived and throve was itself as unknown *as it is at this day* to the same class of men in Britain; that is, fishermen, who deny that it lives on anything; fishermen who say that it lives upon suction, but without attaching the smallest meaning to the word suction. But Leuwenhock says that he "was not content" with the answers of fishermen and merchants, so he commenced opening the stomachs of some fresh herrings caught in the Zuyder Zee. Failing in all attempts to ascertain the real food of the herring, he came to the conclusion that herrings not only "feed on small fishes and even on their own eggs, but that when urged by

hunger they will swallow anything they meet with." This illustrious man, for he truly was so, adopted other theories and hypotheses in regard to the herring: he thought that all herrings were of one year's growth, and that when they once abandoned the coasts they never more returned to them; and, lastly, he concluded that the small fishes on which herrings feed (which, by-the-bye, he admits he could not discover), besides being inconceivably small, "are used but sparingly by the herring."

The Food of the Salmon.

From about midsummer, but more especially with the autumnal floods, salmon and sea trout of various sizes begin to rush up the fresh water streams and rivers: their object in this annual migration is clearly enough made out—they are proceeding to the place of their birth, the original streams in which they first saw the light, there to perform the act of the propagation of their species. As the roe and milt grow the fish get more and more out of condition: from the time it enters the fresh-water rivers it ceases to feed, properly speaking. True, it may be tempted to spring at an artificial fly, or to attack a worm or minnow, in accordance seemingly with its original habits and nature; for whilst it lived as a smolt in the fresh waters the ordinary food of trout was also its food; but from the time it first descends to the ocean as a smolt and tastes its marine food, it never again resorts to its infantile food as a constant mode of nourishment. This great fact, well understood by fishermen and true anglers, Mr. Young, of Invershin, has placed, by direct experiment, beyond all doubt.

But what is the food of the true salmon in the ocean?—that food which he cannot do without?—that food on which relatively all his good qualities depend?

As nothing is ever to be found in the stomach and intestines of the fresh-run salmon but a little reddish substance, I placed a microscope over this substance. After much difficulty I came to the conclusion that it was composed of the ova of some species of the Echinodermata. With salmon, whilst in the sea, this is the constant and sole food: sea trout and hirling also live on it, but they readily take to other food, even in the sea, such as the sand-eel, herring-fry, &c. In fresh-water streams the true salmon does not feed; the sea trout feeds, but does not thrive. The absence of this peculiar food forms an insurmountable obstacle to the localization of the salmon, and even of some kinds of the sea trout in fresh-water lakes.

M. Valenciennes remarks, in his great work on Fishes, that the salmon is "vorace; sa nourriture consiste en poissons; (annodytus tobianis.") There exists not a single fact in the history of British salmon in support of this opinion.

In the absence of positive evidence in respect of the marine food of the salmon various theories have been invented by ingenious men, fishermen, closet naturalists, amateurs, and others, to explain the well-known fact of the seeming emptiness of the stomach and intestines in the high-conditioned fresh-run salmon. These theories require no refutation. Some imagined that the salmon refrained from eating in order to prepare himself for his ascent up the river; we owe this singular fancy to Sir Humphrey Davy. Others imagined that the digestive powers of the salmon resembled a furnace, consuming in an incredibly short space of time all the little fishes they swallow; as the intestines are empty as well as the stomach, they were obliged to assign to the salmon's stomach a power equal to the digestion of indigestible parts, such as the skeleton, lens of the eye, &c. Lastly, some conjectured that the salmon discharges, on being taken, the contents of his stomach; but daily on the Tay at Invershin, and elsewhere, salmon are taken *in large numbers* at a single haul of the seine; I have often seen them so taken. Could such a fact, if true, escape observation? I leave the hypothesis in the hands of the practical fishermen.

In spring, as the spawned fish are descending with the smolts towards the ocean, they may occasionally be tempted with an artificial fly or lob-worm; but as to their *feeding* regularly in rivers, Mr. Young's experiments prove, beyond all doubt, that if they feed they profit nothing by it, losing weight and strength daily during their sojourn in the fresh waters.

*Of the Entomostraca themselves.**

The object of this memoir being simply to establish the fact that many valuable gregarious fishes live, some exclusively, others partly, on the Entomostraca, it is not my intention to say much respecting the minute shell-fish serving as their food. They were first admirably described by Müller and Jurine, and their natural history is tolerably well known. They must be exceedingly prolific, and breed no doubt many times a year: they are abundant in the sea as well as in fresh-water

* Engravings of the specimens of the Entomostraca first discovered in the vendace and herring will be found in my Memoir presented to the Royal Society of Edinburgh.

lakes; and it is easy to see, by their numerous remains in the limestone of Birdiehouse, and in the limestone of other quarters, that they played an important, perhaps the same, part in the economy of the ancient world that they do in this, namely, serving as food to countless shoals of gregarious fishes, which abounded then as now in fresh and marine waters.

The Entomostraca of the Southern hemisphere differ seemingly from those of the northern; there also they serve as the food of gregarious fishes. This was proved by my brother many years ago, in respect of the so-called herring of the Bay of Islands, a gregarious fish abounding in these seas, and living on Entomostraca.

To the minuteness, and, indeed, microscopic character of the Entomostraca, must be ascribed the fact of their having so long escaped the notice of naturalists and others, and causing even distinguished observers to consider their occasional presence in the stomachs of fishes to be merely accidental.

The largest of the gregarious fishes I have as yet observed which lives, or may live, exclusively on the Entomostraca, is the early gray trout of Loch Leven and the char; but I have no doubt that on the American continent there are many admirable fishes of the natural families of Salmonidæ, Corregoni, Clupeadæ, and even others, whose food, when discovered, will be found to be Entomostraca of various species. They vary considerably in size, and seem to extend from pole to pole, consuming the organic remains which but for them might speedily infect the ocean itself.

To the geologist the facts stated in this memoir must, I think, prove of deep interest. Certain of the most productive of the gregarious fishes of past and present times depend for their existence on a class of animals exposed to destruction by chemical or other changes in the waters they inhabit: their destruction would probably involve the fish which prey on them. As regards the herring, these facts may some day explain the capriciousness in the movements of the vast shoals which visit the coasts of Scotland and other northern countries—their appearance and disappearance at various times; for the question of food must be with herrings, as with men, the all important question.

R. Knox.

Miessen House, Upper Clapton.

Calendar of Natural Phenomena observed at Purley Park, Berkshire.
By Cuthbert Collingwood, Esq., M.B., &c., &c.

January, 1855.

1. Robin Redbreast (*Sylvia rubecula*) in full song.
   Starling (*Sturnus vulgaris*) sings.
   Furze (*Ulex europæus*) flowers.
   Shepherd's Purse (*Capsella bursa-pastoris*) flowers.
   Snowdrop (*Galanthus nivalis*), leaves appear.
3. Song Thrush (*Turdus musicus*), song commences.
4. Daisy (*Bellis perennis*) flowers.
   Celandine (*Ranunculus ficaria*), leaves appear.
5. Nuthatch (*Sitta europæa*), call heard.
   Blue Tit (*Parus cæruleus*), note commences.
   Marsh Tit (*Parus palustris*), note commences.
   Missel Thrush (*Turdus viscivorus*), song commences.
6. House-fly (*Musca domestica*) appears, in a room with a fire.
8. Witches' Butter (*Tremella mesenterica*) appears.
   Creeper (*Certhia familiaris*), spring note commences.
   Laurustinus (*Viburnum tinus*) flowers.
9. Great Tit (*Parus major*), note commences.
10. Longtailed Tit (*Parus caudatus*), note commences.
12. Nipplewort (*Lapsana communis*) flowers.
13. Groundsel (*Senecio vulgaris*) flowers.
14. Fish begin to rise.
15. Up to this time the weather has been remarkably mild and spring-like: to-day it changed to frost.
16. Lark (*Alauda arvensis*), song commences.
    Dandelion (*Leontodon taraxacum*) flowers.
17. Green Field Speedwell (*Veronica agrestis*) flowers.
    Buxbaum's Speedwell (*Veronica Buxbaumii*) flowers.
    White Dead-nettle (*Lamium album*) flowers.
    Chickweed (*Stellaria media*) flowers.
18. Hazel (*Corylus avellana*) flowers.
    Annual Meadow-grass (*Poa annua*) flowers.
    Banded Snail (*Helix fasciata*) comes abroad.
    Pied Wagtail (*Motacilla Yarrellii*) first seen.
    (During the night there was a heavy fall of snow, the effects of which were immediately visible, as follows.)

19. Mallards (*Anas boschas*) and Teals (*Anas crecca*) arrive on our waters.
    Wren (*Troglodytes europæus*), song commences.
20. Great, Solitary or Double Snipe (*Scolopax major*) seen.
21. Canada or Cravat Goose (*Anser canadensis*) taken on our waters.
    Wigeon (*Anas Penelope*) and Coot (*Fulica atra*) arrive.
22. Goldeneye (*Fuligula clangula*) seen.
23. Common Gull (*Larus canus*) seen.

Remarks.—The first fifteen days of this month have been remarkably mild, and more like the weather that we should look for in the beginning of April than in January. All nature rapidly advanced: the robin, which had, as usual, been singing all through Christmas, was joined, on New-Year's Day, by the starling, which sang magnificently in my chimney on that day, but which, however, has not continued through the month. On the 3rd the song thrush commenced, preceding the missel thrush, which usually takes the lead in the year, by two days; the tits, of which five species are here common, followed in rapid succession; and six or seven plants were already in flower by the 15th: on that day frost began; nevertheless, a day or two after, two species of Veronica opened their petals, not unaccompanied by other flowers; and it is remarkable that on the 18th, the earth being then frost-bound, the banded snail woke from his winter sleep and marched about in the hedge, two months before his usual time, and doubtless soon to retire again. On the night of the 18th a fall of snow occurred, which was immediately followed by a tribe of wild fowl, consisting of mallards, teals, wigeons, coots, goldeneyes, and other Anatidæ, of which I have no authentic account; and it is worthy of notice that on this very morning, when stress of weather drove hither these hardy birds, the pigmy wren essayed his first spring ditty. On the 21st a pair of the rare solitary snipe alighted near this house; and the following day (another fall of snow having occurred in the night) the lockman brought down a fine specimen of the Canada or cravat goose, which I examined: it weighed 9 lbs., and presented no marks of having escaped from a domesticated state, although I cannot affirm that it had not done so. Other arrivals of Anatidæ have taken place during the latter days of the month; and the last two days have been marked by unusual severity of weather, snow having fallen almost without intermission. As the ground has been more or less covered with snow since the 18th, and it now lies several inches, and in some places several feet deep, it has been

impossible, during that time, to mark the progress of vegetable life. Indeed, animal life has scarcely advanced, and for some days even the robin has been silent; but to-day (February 1st), after two days' incessant snow and a night of uncommon severity, the robin and the wren are singing briskly, and they are also joined by the harsh but *new* voice of the bunting (*Emberiza miliaria*). The river (Thames) is to-day, in many parts, frozen over. A friend shot close by, and submitted to my inspection, two female examples of the scaup duck (*Fuligula marila*), a truly oceanic species, which is not common, and is still more rarely found so far from the sea.

February, 1855.

1. Bunting (*Emberiza miliaria*), song commences.
   Scaup Ducks (*Fuligula marila*) shot.
2. Large flocks of Wild Geese (*Anser segetum*) appear.
   Hedge Accentor (*Accentor modularis*), song commences.
3. Fieldfares (*Turdus pilaris*) and Redwings (*T. iliacus*) migrate further South.
4. Bittern (*Botaurus stellaris*) shot on the banks of the Thames.
5. Green Woodpecker (*Picus viridis*), laughing note commences.
   Primrose (*Primula vulgaris*), leaves appear.
6. Snowdrop (*Galanthus nivalis*) flowers.
   Corn Marygold (*Chrysanthemum Segetum*) flowers.
7. Scarlet Peziza (*P. coccinea*) appears.
10. Butcher's Broom (*Ruscus aculeatus*), red berries appear.
17. Hoopers or Whistling Swans (*Cygnus ferus*) visit us.
20. Ring Dove (*Columba palumbus*) coos.
21. Partridges (*Perdix cinerea*) pair.
22. Yew (*Taxus baccata*) flowers.
23. Japan Quince (*Cydonia japonica*) leafs.
    N.B. After a smart fall of snow this morning the frost broke up.
24. Yellowhammer (*Emberiza flava*), song commences.
    Winter Aconite (*Helleborus hyemalis*) flowers.
25. Chaffinch (*Fringilla cœlebs*), song commences.
    Squirrel (*Sciurus vulgaris*) leaves his winter retreat.
    Gnats (*Culices* and *Chironomi*) appear in clouds.
    Thrush (*Turdus musicus*) resumes his song, after seven weeks' intermission.
    White or Barn Owl (*Strix flammea*) screeches.
26. Skylark (*Alauda arvensis*), song commences.
    Hoopers or Whistling Swans (*Cygnus ferus*) return northwards.

26. Snipe (*Scolopax gallinago*) last seen.
    Wild Duck (*Anas boschas*) last seen.
27. Bean Geese (*Anser segetum*) return Northward.
    Pansy (*Viola tricolor*) flowers.
28. Bunting (*Emberiza miliaria*) resumes his song, after four weeks' intermission.
    Redwings (*Turdus iliacus*) and Fieldfares (*T. pilaris*) return from their second migration.
    First Lepidopterous insect (*Hibernia* ——— ?) seen on the wing.

Remarks.—The month of February has, in many respects, differed considerably from the preceding month in atmospheric influences, and their effects upon animal and vegetable life. The first two-thirds of January were comparable with ordinary March and April weather, and the last fortnight, although more seasonable, only paved the way for binding up the whole month of February in the iron bonds of an unusually severe winter. Instead of bathing in the river, as I did during the first half of January, the corresponding part of February saw me skating on its frozen surface. Nature, which advanced with too rapid strides in January, has, in February, been unduly repressed. A frozen month of drifted snow has enveloped the earth for six weeks, in some places so thickly that the absence both of light and air has materially checked the growth of the early spring plants; so that vegetation, in those places where a botanist would look for its gradual advance—in the hedgerows and woods—has been almost at a stand-still; the very lanes themselves being, in many instances, impassable from the accumulated snow. The effects of this inhospitable covering over the otherwise bountiful table of Nature have been manifest on that class of animals which chiefly look to it for supplies. The granivorous birds have been hard pressed by hunger; and the insectivorous birds have felt even more keenly the common destruction of their natural food, and the difficulty of obtaining those supplies which yet remained. It is remarkable that, contrary to the popular impression, the supply of "hips and haws," which form the subsistence of a large number of birds, especially in default of other food, was this winter extremely scanty, in fact, almost entirely deficient. Under these circumstances, it is not surprising that, during the late hard weather, birds should not unfrequently have been found dead, having perished from the failure of supplies, and the consequent severity of the *cold*, which alone would not have affected them. During the whole time that the frost has

lasted, those birds which had previously been in song have intermitted their notes, being doubtless too much occupied in the earnest search for a precarious subsistence to indulge in those buoyant feelings which induce song. This applies to all *ground-feeders*, with scarcely an exception; but it is worthy of remark that the busy tribe of the tits (*Paridæ*), which find their food principally in the crevices of the bark of trees, have been active and busy throughout, and have enlivened the plantations with an unceasing volley of sprightly notes. The same remark applies to the nuthatch (*Sitta europæa*), whose loud and business-like whistle is never wanting, for the same reason. A curious effect of the unwonted keenness of the past winter was exhibited by the fieldfares and their congeners, the redwings: they have performed a distinct double migration. On the 2nd of the month, while travelling to Oxford, I saw large flocks of these birds in the fields all the way along; but since that day, for a space of nearly four weeks, I have looked in vain for a single one. I conjectured that they had sought a more southern and congenial climate, and I anticipated that when the frost broke they would return; and, indeed, yesterday (February 28) they *did* return, and reappeared in our meadows in vast numbers and in good condition.

The month opened with the most wintry aspect that can well be imagined. For the last forty-eight hours in January the snow had been incessant and the nights severe; but neither frost nor snow had as yet influenced the condition of our passerine birds, and the bunting (*Emberiza miliaria*) opened the month with his harsh note: his example was followed the next day by the hedgesparrow (*Accentor modularis*), and it is curious, as an example of the varying influence of the seasons on different classes of birds, that at the moment I was arrested by first hearing his note I was engaged in watching the majestic flight of twenty-one wild geese (*Anser segetum*), as, driven from their usual haunts by the freezing of the waters, they sailed in one long, unbroken line, about 100 yards overhead; but the birds just mentioned soon felt the chilling influence, and ceased singing almost as soon as they had begun; nor were they joined by any new voices until the latter part of the month. On the night of the 3rd a remarkably rapid thaw, succeeded by a no less rapid frost, in the space of a few hours produced a curious result: every tree, from the largest branches to the smallest twigs, was in the morning encased in a transparent tube of ice, which glittered beautifully in the sunlight. For two or three days it continued to thaw under the influence of the sun, freezing again at night, so that by the 6th the snow had almost disappeared, disclosing a few

flowers which flourish despite the frost; but among them was one which I should little have expected to find in such circumstances: in an open turnip-field, half-covered with frozen snow, I plucked a handsome and fully-expanded blossom of the corn marigold (*Chrysanthemum Segetum*), a plant which we are accustomed to see blooming in July among the ripening grain. On the 7th a considerable fall of snow took place, which has not yet entirely disappeared: from that day until the 23rd was an unceasing frost, and the most trying part of the whole winter to the feathered tribes: the days were all unusually fine, and the nights clear and bright, the thermometer generally sinking below 20° F. The number of wild fowl visiting our streams have not increased in proportion to the severity of the weather, and that for two reasons:—in the first place, the country being densely populated, there was little chance of rest for birds, which every one who possesses a gun considered fair game; and, secondly and chiefly, the river and other waters have long been almost entirely closed up by ice, so that they are forced to proceed further in search of open waters, which are necessary to their existence; nevertheless, we have had some variety of them, as follows:—

More than one flock of wild swans (*Cygnus ferus*) have passed this way. The first flock of these magnificent birds I had the good fortune to see; it consisted of six, one of which was shot near Reading, and sold by the shooter for one guinea; the remaining five, when I saw them, were hovering over a small piece of open water near the lock, attracted there by the presence of a pair of tame swans (*Cygnus olor*). These birds are very unusual here, and are only seen in the hardest winters: the lockman tells me, however, that he has seen them settle in the meadows, and feed there for a whole morning, during which time he was deterred from shooting them by the idea that they were only the tame swans of the neighbouring ornamental waters.

Wild Geese. I am not sure whether more than one species has visited us this year, viz., the Bean Goose (*Anser segetum*), but numerous large flocks have been seen.

Wild Duck (*Anas boschas*). The earliest and latest wild fowl that have been observed, and also the most common.

Wigeon (*Anas Penelope*). Not unfrequent.

Teal (*Anas crecca*). A very few at the commencement of the frost.

Scaup Duck (*Fuligula marila*). Two or three have been shot close by.

Goldeneye (*Fuligula clangula*). Several of these handsome birds have been taken: the last, a most beautiful male specimen, was shot

on the 21st, and is stuffed and placed with others in the hall of this house.

Pochard (*Fuligula ferina*). Six of these delicious birds, only inferior to the canvas-back duck of America, were killed in one afternoon, on the 16th, by a gentleman, a quarter of a mile from this house. There have been other species, but these are all I have myself seen. The genus Fuligula, to which the last three belong, consists of marine ducks of diving habits, which are not usually seen inland, unless pressed by strong necessity.

The occurrence of the bittern (*Botaurus stellaris*) should be noticed, as it is a bird fast becoming rare; and, moreover, in the part of the river where it was shot, the cover of reeds, &c., is very scanty for so large and shy a bird.

It will be seen, in my Calendar for the past month, that from the 7th to the 17th but one observation was registered. This was to be expected during such a dead season, and, in default of other and more active sources of remark, I found not a little interest in the study of what may be called the "Ichnology of the snow." In so soft a material the gentlest footfalls, though unheard, leave an impression which betrays the track of many a watchful animal. Of all the impressions thus produced, by far the most numerous, and by far the most universal, were those of the wild rabbit (*Lepus cuniculus*), with a sprinkling of hares (*L. timidus*), the two hind-feet parallel, and one fore-foot a little advanced before the other, thus ∞. There is not a spot, however exposed, where these wary animals do not venture at night: their marks were almost as numerous at the threshold of my door and under my window as among their burrows in the copse. Out in the open fields the cautious grimalkin had stalked, in search, I suppose, of feathered prey; and pairs of minute depressions at regular intervals showed where the little hardy shrew (*Sorex araneus*) had made a short journey; but the birds presented by far the greatest variety of footsteps. The marks of the passerine birds in the shrubberies were comparatively rare: they seem to have confined themselves more to the trees; but in the stubble fields, for acres in extent, not a square inch was left unimpressed by the busy feet of flocks of larks. Almost as numerous, but more circumscribed, were the foot-prints of the starlings. Some few largish footmarks were left by the rooks, but very few, considering their numbers. A zigzag series of impressions, for nearly a furlong in extent, showed where a covey of partridges had been feeding; while perhaps a dozen impressions of three large spreading toes here and there by the river-side, betrayed the spot

where a heron (*Ardea cinerea*) had alighted. The indistinct impressions left by the webbed feet of the ducks (*Anatidæ*) readily distinguished them from the clearer marks of the moorhen (*Gallinula chloropus*), although of the same size, and situated precisely in the same position at the water's edge.

About the 20th the soft cooing of the ring dove and the pairing of the partridges gave indications of approaching spring, and these symptoms were followed by a sudden and rapid thaw on the 23rd, occurring immediately after a short but heavy fall of snow. All at once the face of Nature was changed: on the 25th the thermometer stood at 48° F., and the air, after having been so long cold and bracing, felt oppressively warm. The effect was magical; the snow, except where it had drifted deep, had disappeared; the groves resounded with the voices of birds, rejoicing in the downfal of the iron rule of Winter; but all the rest were almost drowned by the hitherto unheard, but now universal, song of the musical chaffinch; the little squirrel quitted his retreat, and leaped nimbly from bough to bough; the thrush, after seven weeks of mournful silence, ushered in the evening with his tuneful voice; and even the stillness of night was broken, for the first time, by the shrill and prolonged scream of the white owl. The business of pairing has scarcely commenced yet; the domestic birds, the fowl and pigeon, it is true, have broods a month old: the jackdaw (*Corvus monedula*) made attempts to pair early in January before the frost set in, but their domestic arrangements were of course interrupted: the only birds which have *really* paired are the hardy partridges; but their example will quickly be followed by the rooks, which have suffered much during the late hard weather, but which for the last day or two have shown that restless activity which foreshadows the important business of the season of love.

In conclusion, I trust I may say, "The winter is over and gone, and the time of the singing of birds is come;" and I hope that before I close the account of the present month I may be able to announce the arrival of the first of our summer birds of passage, the pretty and amusing chiffchaff.

March, 1855.

1. Hive Bee (*Apis mellifica*) comes abroad.
   Rooks (*Corvus frugilegus*) pair.
   Missel Thrush (*Turdus viscivorus*) resumes his song, after seven weeks' interval.

1. Field Spiders appear in numbers.
   Redwings (*Turdus iliacus*) and Fieldfares (*T. pilaris*) last seen.
2. Seven-spotted Ladybird (*Coccinella 7-punctata*) appears.
   Elder (*Sambucus nigra*) leafs.
   Common Honeysuckle (*Lonicera periclymenum*) leafs.
3. House-flies (*Musca domestica*) appear in rooms without a fire.
   Spurge Laurel (*Daphne Laureola*) flowers.
4. Spiders shoot their webs.
   Rooks build.
5. Cuckoo-Pint (*Arum maculatum*) unfolds its leaves.
   Holly (*Ilex aquifolium*) mined by the larva of Phytomyza aquifolia, a Dipterous insect.
6. Alder (*Alnus viscosa*) flowers.
   Gossamer (*Aranea aëronautica*) appears.
   Water Vole, Water Rat (*Arvicola amphibius*) comes abroad.
   Tufted Duck (*Fuligula cristata*) visits us.
7. Starling (*Sturnus vulgaris*) resumes his song.
   Greenfinch (*Coccothraustes chloris*), song commences.
8. Jay (*Garrulus glandarius*) pairs.
9. Wallflower (*Cheiranthus fruticulosus*) flowers.

10 and 11. Heavy snow.

13. White Willow (*Salix alba*), catkins open.
14. Lesser Periwinkle (*Vinca minor*) flowers.
15. Arbor-vitæ flowers.
16. Goldilocks (*Ranunculus auricomus*) flowers.
17. Lungwort (*Pulmonaria officinalis*) flowers.
    Woodlark (*Alauda arborea*), song commences.
18. Gooseberry (*Ribes grossularia*) leafs.
    Aspen (*Populus tremula*) flowers.
19. Polyanthus (*Primula polyantha*) flowers.
    Common Ladybird (*Coccinella variabilis*) appears.
20. Goldencrested Wren (*Regulus auricapillus*), song commences.
    Primrose (*Primula vulgaris*) flowers.
    Brimstone Butterfly (*Gonepteryx Rhamni*) appears.
    Stock Dove (*Columba œnas*) coos.
    Scarlet Satin-mite (*Trombidium holosericeum*) appears.

21 *et seq.* E. winds and sleet.

21. Diving Duck (*Fuligula* ——— ?) last seen.
23. Ivy (*Hedera Helix*), berries ripen.
24. Song Thrush (*Turdus musicus*) builds.
25. Dog's Mercury (*Mercurialis perennis*) flowers.

25. Wood Strawberry (*Fragaria vesca*) flowers.
26. Lesser Celandine (*Ranunculus Ficaria*) flowers.
    Woodlouse (*Oniscus asellus*) appears.
    Gray Wagtail (*Motacilla boarula*) last seen.
27. Very heavy fall of snow in the night.
29. Coltsfoot (*Tussilago farfara*) flowers.
31. Goldfinch (*Carduelis elegans*), song commences.
    Ivy-leaved Speedwell (*Veronica hederifolia*) flowers.

Remarks.—The struggles of regenerated Nature in spring to regain the victory over the grave of winter have been this month unusually protracted and severe: for a time it has seemed as though the new-born season had established its dominion, when suddenly the icy clutch of its expiring predecessor has been felt in all its severity, and although we well know which must ultimately prevail, yet up to near the close of the month there appears but small advantage on either side. Indeed, the month of March has been singularly transitional; although it "came in," contrary to the popular adage, "like a lamb," yet its lamb-like qualities did not long endure, except, indeed, in one respect—that, namely, of yielding abundance of wool. On the 10th and 11th, after some fair, spring-like weather, there suddenly came a fall of snow, so heavy and long-continued, and so unaccompanied by wind, that the surface of the earth presented the most perfect and beautiful snow-scene we have had this winter: it all disappeared, however, in one day (the 12th), and after another interval of ten days, during which we enjoyed some lovely days (especially the 20th), the 21st ushered in a cold and violent easterly wind, with abundance of sleet, and the waters were frozen for several successive nights. Still the spring recovered itself sufficiently to show its smiles on the 26th, when, lo! as if in revenge, the night of the 27th brought the heaviest fall of snow with which this winter has favoured us: so heavy was it that had it not melted as fast as it fell it would have laid much deeper on the ground than from any previous fall. The last day of the month, however, gives promise that spring, assisted by the advancing year, will soon shake off the mantle of winter. I am thus particular in giving a summary of the weather, because the welfare and advancement of animal and vegetable life so much depend upon it: of the two animated kingdoms, however, the vegetable has suffered far more this month than the animal, and its effects upon it are far more enduring. The impetus given to animal life by the dissolution of the long frost in the latter part of February has never been interrupted,

but for a day or two at a time: vegetation, however, during the whole month, has made but very slender advances; on the whole, it is now at least one month behind the usual period in an average year; in many instances it has, to all appearance, been stationary for weeks together: thus, the common snowdrop, which, during the whole of February and the greater part of March presented the same aspect, is still in full bloom, although the first spring bird of passage has made its appearance; the buds of the box tree (*Buxus sempervirens*) I have watched for full six weeks, and during that time they have undergone no perceptible change, nor are they apparently any nearer opening now than they were in the middle of February; the blushing buds of the Japan quince (*Cydonia japonica*) were apparently ready to burst at the beginning of the month, but they have not yet opened. On the other hand, those early builders, the rooks, commenced operations on the 4th instant, only four days later than last year, and the chiffchaff appeared with his sprightly note by the 1st of April, rather before the average time, and in like manner with other birds. Those insects also that I have observed have not made their appearance much after the usual time.

It is easier to note the arrival of birds than their departure; and I, who make up my list at the end of each month, may be led, for a time, into the assumption that a bird has taken its departure, whereas it may yet reappear after an interval. Thus, in my calendar for February, I wrote, "26. Wild duck last seen," supposing from the apparently settled state of the weather that we should see them no more; but during the past month they have frequently appeared, and even up to the last hour of the month: I flushed a brace towards midnight on the 31st, as I was walking along the banks of the river by moonlight; indeed, I am assured that this species occasionally remains with us, and breeds in the deep ditches near the river; but not only have the common species been seen from time to time, but on the 6th we were visited by a species hitherto, this season, new to us: a party of nine tufted ducks (*Fuligula cristata*), the usual companions of those species previously enumerated, spent the morning upon the river, and one specimen was procured. Even as late as the 21st an oceanic duck of this genus (Fuligula) was seen, but that I think will be the last. I should remark that, in my list of Anatidæ last month, I omitted the cravat goose (*Anser canadensis*), which, it will be remembered, was killed here on the 20th January, making altogether four genera and ten species which have come under my immediate notice this winter. A little before Easter, some years since, the man who still occupies the lock-house shot a pair of birds which puzzled him: although very

unusual-looking birds he did not take them to any connoisseur, but, after a little debate with his wife, they agreed to make an Easter Sunday dinner of them, which they accordingly did. These birds proved to be a pair of the beautiful and rare white spoonbills (*Platalea leucorodia*), and, much to their chagrin, the worthy couple found that they had made a dear repast, although obtained for nothing: an esteemed friend of mine, who then lived in this house, and who possesses a beautiful collection of British birds, stuffed with his own hand, would willingly have given five guineas to have added so valuable a desideratum to them; but I believe they did not even save *their spoons.*

In making observations on Natural History it is necessary that the observer be extremely careful, lest he be led astray by one of the numerous fallacies to which he is especially liable, and to set down with caution any extraordinary circumstance, making due allowance for sources of error. I am led to this remark by something which occurred about the middle of the month: observing a number of dead fishes accumulated in a certain reach of the river, I was led to examine more closely, when I found that in a space of about 150 yards there were 182 dead fishes. Now and then I took from the water a fish which floated by, but still gasped for breath, although incapable of motion. All these fishes were more or less covered with a sort of fungoid growth, which, I was well aware, generally proved fatal when it appeared upon them, gradually spreading all over them, and destroying their vital functions. Moreover, on a further examination, I found that, with the exception of a very few dace (*Leuciscus vulgaris*) and bleak (*L. alburnus*), all these fishes were roach (*L. rutilus*), and not a single perch (*Perca fluviatilis*) was to be seen among them, although these last fish are very plentiful in the river. On a *primâ facie* view of this evidence I was inclined to believe that this disease had been *epidemic* among the roach, or was at least confined to the genus Leuciscus. In this mind I made further inquiries, and at length elucidated the mystery. On asking the fisherman who rents the water whether he had thrown away any fish, he told me as follows: having received an order for a number of live roach he netted the required quantity, and placed them in his live-box, to be ready when sent for. One night the box broke its moorings and disappeared: it was upwards of three weeks before it was discovered, and during that time the fish had become what the fishermen aptly enough call "furred," the almost inevitable result of the confinement of too great a number of fish in a small space for too long a time: as they were

nearly all dead he threw them away into the river, and they had floated down and collected in the spot where I saw them. The nature of the disease, for disease it is, after all, is, I believe, that of a parasitic fungus, and the only account of it I ever met with is in an early number of the 'Illustrated London Almanac,' perhaps ten years ago. I was sorry to see in the tank at the Crystal Palace, last week, a fine pike lying at the bottom "furred" and dead. I may mention further a remarkable fact, and one that should be known, namely, that the presence of a barbel (*Barbus vulgaris*) or two will *prevent* the furring of fish in confinement.

In further confirmation of what I advanced previously, I may state that sheep have been remarkably prolific this spring. Those lambs which the farmers designate *stock* or grass lambs, and which are born generally early in March, or about two months later than the *house* lambs, have been wonderfully numerous. In a flock of 300 ewes, belonging to a farming friend, 120 produced doubles, and there were besides a considerable number of *threes:* nor is this a peculiar case, but it is, I believe, the general good fortune of the breeders this spring. But if the farmers may congratulate themselves on a good lambing season, their complacency has a limit. There is an old adage, "A cold March and a crop of wheat;" but the same gentleman assures me that in examining his wheat-fields, a week or two ago, he was chagrined to see that the violent and cold winds had laid bare the roots of the young wheat-plants, and exercised such a deleterious influence upon them, in that tender state, that he looks forward to their produce being an utter failure. I trust, however, that either he is too readily alarmed or that this accident is far from being general.

All our indigenous birds, with a very few exceptions, are now in full song. These exceptions are somewhat singular: in the first place, ever since I have been here I have never seen or heard a single linnet (*Linota cannabina*), a bird usually common; neither have I yet *seen* a goldfinch (*Carduelis elegans*), although I have once heard him: both these birds are well known here, however, and I cannot account for their absence, which I can only regard as temporary. But it is remarkable that the blackbird, which usually commences his song in February, has not yet been heard: they are often enough *seen*, although not in the usual numbers, which I attribute to their having been greatly thinned by the protracted frost: I have not unfrequently found them dead. The rook also, I have no doubt, suffered greatly, and were much reduced in numbers; an establishment of thirty-seven nests in one part of our grounds, which were occupied last year, is this spring

entirely deserted. I shall be anxious to see whether the lateness of the spring will have any effect in retarding the arrival of our summer birds of passage: there is such an intimate relation between vegetables and animals, as regards the means of subsistence, whether directly or indirectly, through the insect world, that I can hardly expect to see them return punctually; nevertheless, the first of them, the chiffchaff (*Sylvia hippolais*), of whose advent I spoke in my last, made himself very distinctly heard this morning, which is rather before the average time. The behaviour of the fieldfares and redwings has most puzzled me: it will be remembered that they made a second migration early in February, and returned on the 28th: on that day and the next (March 1st) large numbers were seen in our meadows, but since then *none* all through the month, although these species do not usually leave us till the middle of April.

But the ornithologists' month *par excellence* has now commenced; and its occurrenees, to which I look with the liveliest interest, shall be duly forwarded to the 'Zoologist.'

C. Collingwood.

Purley Park, April 1, 1855.

Toads long known to be Enemies of the Hive-Bee.—At the meeting of the Entomological Society on the 5th of March last, I was much gratified by the observations which were read on the animals destructive to hive-bees; but more particularly so with Mr. Muskett's observation that "it is no doubt well known that the common toad will sit at the entrance of the hive and devour the bees, one after another, as they come within reach of his tongue." This not only confirmed a similar statement made known to the Society upwards of twelve months ago, but it appeared to treat the circumstance as one well known to bee-keepers, or at least as one respecting which Mr. Muskett had no doubt whatever; but he proceeded to state, in his communication, a fact which did appear singular—namely, that of the common woodpecker devouring bees in great numbers at the mouth of the hive: this appeared to Mr. Muskett to be a new fact in bee-history; that of the toad was new and interesting to Mr. Westwood. Alas! "there is nothing new under the sun." I have before me a quaint old book intituled 'Profit and Pleasure United; or, the Husbandman's Magazine; being a Treatise on all kinds of Domestic Cattle, on the Improvement of Land, and on Gardening: to which is added Directions for the Encreasing and Preserving of Bees.' The latter part of this title tells us at once that the author, "J. Smith, Gent.," was aware that they had enemies: this we shall see presently was undoubtedly the fact of the case. The article on the honey-bee is a very short one, but full of information; it commences thus:—"The Bee, though a small creature, and by many numbred amongst Insects, is extreamly Advantagious to his Nurisher in returning abundance for the little he receives." Our author, like a practical man, thoroughly earnest in his purpose, begins with directions for procuring your bees: to store yourself with bees, he says, there are three manner of ways—"Buying them, Taking wild Swarms, or making them by Art:"

then follow directions for knowing which swarms are to be selected when purchasing, and most likely to be profitable to their nourisher: next, "To store your Self with Wild Bees, Take such as Breed in Clefts of Oaks, or other Trees, in Fields, Forrests or Wildernesses, or in rocks, or Ruins of Castles or Churches:" "To find them out, set a little Box with a small hole in it, near the Water-side, whither you perceive the bees to resort, and when many have entered, for the Sugar and Honey put therein, stop up the hole, and let one out, follow him as far as you can see him, then let out another, following him likewise, and so a Third, till by their flying directly (for so they will) to the place of their abode, you find them out." Admirable ingenuity! and so there were honey-bees to be seen in clefts of trees, in rocks and ruins, in J. Smith's time (1704). I never met with more than one swarm, in a wood near Barnet—doubtless one that had escaped its "Nurisher." Our author proceeds:—"Having found them, smoak them out, and settle them by the ringing of any Brass Vessel." It is to be regretted that no directions are given for "making them by Art;" but here follows a list of "all which are *utter Enemies* to the Bees"—the toad, redbreast, woodpeckers, moth, hornet, lizard, swallow, sparrow, spider, butterfly, serpent and stork. First and foremost, our author places the toad; and the list, it will be seen, includes the woodpecker, mentioned as destructive to bees. In what manner some of the "utter enemies" are prejudicial to the bee I am not prepared to say, nor does our author afford any information on the subject: he emphatically denounces the whole host as "utter enemies." The essay concludes with directions for taking the honey from the hives, and the management of the swarms; on this head one direction is admirable, and deserves to be quoted—"If the Master-Bee, or King, be too apt to lead the swarm abroad, clip his wings, and then, not daring to trust them, he will stay at home"! I cannot do better than conclude, in the words of the author, "And thus much shall suffice for the ordering of Bees, from whose labour rises great Profit to most Kingdoms."—*Frederick Smith; April* 12, 1855.

A Word on the Use of Initial Capitals to Specific Names.—We are agreed on using initial capitals for genera, but we have no law as to initial capitals for species; for we cannot certainly reckon as a law that draft of a bill which was sent down to us from the Upper House, *videlicet*, the British Association, and which we, the Representatives of the People, threw out, *nemine contradicente*. Now, having no law, every one does exactly as he pleases; and not only are no *two* entomologists consistent with each other, but no *one*, as far as my knowledge extends, is consistent with himself. It is difficult to believe or understand the trouble which this diversity of practice gives to an editor, more especially should it so fall out that his contributor, having steadfast faith in his own critical sagacity, demands to see a proof; for then the said contributor, being in absolute command of a ship that has no rudder, and purring complacently over the unwonted authority he is enjoying, is sure to assume the printer to be in error, and incontinently to alter every small letter to a capital, and every capital letter to a small one. It is with a view to relieve entomologists of this critical labour that I suggest this simple rule—As all specific names must be substantives or adjectives, let every substantive (nominative or genitive), and no adjective, have an initial capital. One exception only occurs to me, but *exceptio constat regulam;* it is when a man's name is converted into an adjective, as Metterbacheriana or Abildgaardana,—I don't much envy these insects or their godfathers,—then the capitals must of course be preserved as signboards to testify to future generations that it is mortal men have been thus immortalized; otherwise, the *cui bono* of these ponderous monuments of genius, like that of their

fellows on Salisbury Plain, must grievously puzzle philosophers yet unborn.—*Edward Newman.*

Gonepteryx Rhamni double-brooded.—Touching the question whether Gonepteryx Rhamni be double-brooded, no one, I presume, can deny that there are at least two (if not more) flights of the insect in the course of the year; and this perhaps may be all that Mr. Hawker meant by saying that it is "double-brooded." Certain it is that the insect appears on the wing in the early spring, and again later in the year, generally in August, according to my own experience, or the end of July. In the 'Butterfly Collector's Vade Mecum,' "spring, beginning of June, and in autumn" are stated as the periods of its flight. The Rev. F. O. Morris says, "There are two broods, one in May, the other in the autumn. Many of the autumnal brood live through the winter, and are to be seen in the spring, even so early sometimes as February and March." "These early specimens," say Humphreys and Westwood, "have survived the winter, and produce eggs, from which a fresh brood of butterflies is produced in May, and another in the autumn, some of which last again survive the winter." Time was when I used to suppose that all the early vernal specimens were such as had hybernated, or lived through the winter in the winged state; but in this opinion I stood corrected by a practical entomologist, who directed my attention to the perfectly fresh and brilliant condition in which some, at least, of the vernal specimens appeared, which showed, he said, that they could not have hybernated, but must have emerged from the chrysalis at that early season. If this be so,—if there are two different periods of the year at which G. Rhamni comes forth from the chrysalis,—is it not an insect, which, in the language of collectors, is styled "double-brooded?" I well remember being once called to account by a talented naturalist for using the term "double-brooded" as applied to an insect which makes its appearance at two different times of the year. The expression, I was told, was ambiguous and incorrect. I merely replied that I believed it was perfectly intelligible to all collectors, and the term constantly employed by them to express an insect of which there are two flights during the year. Nobody doubts that this is the case with G. Rhamni, whether the specimens have hybernated, or come fresh from the chrysalis in the spring. Probably some individuals fall under one description, and some under the other. I am surprised, therefore, to find that the idea of G. Rhamni being double-brooded should be new to Mr. Newman, Mr. Doubleday and other eminent Lepidopterists (Zool. p. 4706). I will add that Haworth says, under Papilio Rhamni, "Mas et fem. vivant per hyemem. Femina ova ponit tempore vernali." Though, strange to say, both in his 'Prodromus' and in 'Lepidoptera Britannica,' he merely gives the beginning of June as the time of the insects appearing.—*W. T. Bree; Allesley Rectory, May* 12, 1855.

Capture of Gastropacha ilicifolia on Cannoch Chase.—I hasten to inform you that two specimens of Gastropacha ilicifolia were this day captured on Cannoch Chase, near Rugeley, Staffordshire, by my friend Arthur Partridge, Esq. The insects were in repose on an old oak post, not many yards from the spot in which the first English specimen was taken by my brother, W. S. Atkinson, Esq., in May, 1851. Not being myself an entomologist I must content myself with mentioning the fact.—*H. G. Atkinson, Curate of Rugeley; April* 27, 1855.

Occurrence of Notodonta carmelita in Kent.—A single specimen of this rare insect was taken at West Wickham by Mr. Standish, jun., on the 13th of May, and a second by myself on the 14th; the last-mentioned was a female in fine condition.—*William Machin; 35, William Street, Globe Fields, Mile End, May* 15, 1855.

Singular State of a living Helops.—The power that insects and other creatures of the same height in the scale of being possess of existing, with little apparent inconvenience, under circumstances that would at once be fatal to any of the higher orders, is so well known that, generally speaking, such cases are perhaps little worth recording. The following is, I think, however, sufficiently remarkable to be mentioned:—Four or five years ago, in investigating a hollow tree, in the park here, which had often repaid my trouble, I noticed something singular in the appearance of a specimen of Helops striatus, and, having secured it, found a small portion of one elytron was broken away, and every vestige of the contents of the abdomen cleared. This could not have been the result of any sudden crush or other accident, but must apparently have been the work of ants, or something else of similar propensities, as the insect was otherwise uninjured, yet, notwithstanding its condition—hollow as a lantern—it was crawling about nearly as actively as if in its natural state: probably it had been thus some time, for the ants, or whatever they were, must have consumed time as well as the hapless insect's interior. I have the specimen now pinned through the thorax, the only available *point-d'appui*, with the label, "Found in this state alive and active." Poor Helops! dull as his feelings might be, he must have been conscious of a void within which nothing could supply.—*George Guyon; Richmond, Surrey, April* 18, 1855.

Egg and Young Larva of Crymodes Templi.—For a long time I have believed that the eggs of this highly interesting insect were not deposited until the spring, a supposition which has been confirmed, as far as individual observation goes. On the breaking up of the frost I succeeded in finding a fine, perfect female: on the 16th of March she began to deposit her eggs, and continued laying until near the 30th, when she died. The eggs appeared of small size, in proportion to the moth, and were so firmly glued to the box that I could not detach them, otherwise I would have sent some to be engraved for the 'Zoologist,' as I think they would have possessed much interest for its readers. The following particulars of the egg may be noticed:—From the equator to the crown rose about thirty very prominent ribs, meeting in a point; in fact, arranged precisely as the meridians on a globe: the colour, when the egg was first deposited was a light orange, but in about a fortnight the equatorial region assumed a most beautiful purple hue, which gradually faded upwards towards the crown: near the time of hatching both the orange and purple colours vanished entirely, giving place to a uniform chocolate-brown. They began to hatch about the 24th of April, and more than three hundred larvæ have appeared: I gave them every kind of food I could think of, but without success: one or two ate slightly of ragwort and yarrow, but not sufficient to keep them alive. The head of the larva is remarkably large, in proportion to the size of the body, and quite black: the body is green and perfectly smooth.—*Job Johnson; Denby Parsonage, near Huddersfield, May* 19, 1855.

Proceedings of Societies.

Society of British Entomologists.

April 18, 1855.—Mr. Harding, President, in the chair.

Multitudes of dead Flies on a panicle of Grass.

Mr. Miller exhibited the panicle of a common grass, to the blossoms of which were attached numbers of a species of Dipterous insect; and remarked that while at Darenth

Wood, on the 19th of August last, his attention was drawn to the grass by observing the insects attached in great numbers to its blossoms, and perfectly lifeless: in no instance could he observe a living specimen; and he added that while the heads of the grass were thickly covered with the dead insects, the surrounding herbage, with but few exceptions, was entirely free.

Mr. Harding stated that he was with Mr. Miller on the above occasion, and was greatly astonished at the thousands of dead specimens that covered every panicle of grass: he considered the mortality was due to atmospheric influence, and read some extracts bearing upon the subject from the seventh volume of Loudon's 'Magazine of Natural History.'

Mr. Jobson suggested that probably they had been feeding upon some plant of a poisonous nature.

Mr. Harding differed from this opinion, remarking that, if this were the case, such a circumstance would be of common occurrence, whereas he had not, during his experience, noted a similar instance.

Mr. Miller thought they had been attracted by some glutinous secretion of the blossoms, from which they had been unable to detach themselves, and had thus been starved to death, for, on examination, he found them to be firmly attached by the proboscis, and requiring some slight degree of force to remove them.

Offensive Fluid emitted by Melasoma Populi.

Mr. Miller also stated that while in the same locality, at a later period of the year, he observed a number of larvæ of Melasoma Populi, from the sides of which, on the slightest noise or on being touched, a white exudation took place, which gave out a very disagreeable odour, but was withdrawn on the danger passing away.

Habits and Food of Tineidæ.

Mr. Miller exhibited some mined leaves of a Geum, which Mr. Stainton informed him he suspected were caused by the larvæ of Nepticula aurella, and that similar mines had been observed in the leaves of Fragaria vesca and other plants, which were most probably referrible to this species: also larvæ of Elachista rufocinerea, E. atricomella, Solenobia inconspicuella, Gelechia tricolorella, &c.; remarking of the former, that although abundant, up to the spring of last year all attempts to discover the larvæ had failed, when it was observed mining the leaves of Holcus mollis.

Natural History of the Tortricidæ.

Messrs. Harding and Miller intimated their intention to investigate, during the present season, the habits and transformations of the Tortricidæ, so as to elucidate, as far as possible, the natural history of this interesting family, and intimated that any information upon this subject from friends or Members of the Society, accompanied, when practicable, by the larva, would be highly useful and esteemed.

May 1, 1855.—Mr. Harding, President, in the chair.

Captures of rare Lepidoptera.

Mr. Harding exhibited a box of beautiful insects, among which were Tæniocampa munda, some remarkable varieties of T. instabilis, specimens of Notodonta dodonea,

several specimens of Cloantha conspicillaris, bred from the egg, specimens of Ennomos illustraria, Aleucis pictaria, and several other species: he likewise exhibited some larvæ of Coleophora solitariella, feeding on Stellaria holostea, and the larva of Elachista Stainloni, on the leaves of Helianthemum vulgare.

Larva of Polyommatus Agestis.

Mr. Harding observed that, in his 'Entomological Botany' (Zool. 4681), Mr. Stainton expresses some doubt as to the Erodium being the food of Polyommatus Agestis; but, for the last three years, he (Mr. H.) had taken the larvæ of this insect feeding on this plant, and had bred them: he should feel great pleasure, if he met with it again, in sending the larva to any entomologist who may wish to have it.

Galls of Cynips Rosæ.

Mr. Harding also exhibited a number of the cocoons of Cynips Rosæ, forming several large masses, on the stem of a wild-rose twig: many of the insects were emerging from the cocoons.—*J. T. N.*

Entomological Society.

May 7, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. vii. No. 11; by the Society. The 'Athenæum' for March and April; by the Editor. The 'Literary Gazette' for April; by the Editor. The 'Zoologist' for May; by the Editor. 'List of Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part ii., Lepidoptera-Heterocera; by F. Walker, Esq. 'A List of the British Species of Geodephaga intended for marking Desiderata and Labelling Collections, taken from Mr. Dawson's Geodephaga Britannica,' by G. Guyon; two copies, by the Author. 'Annales de la Société Entomologique de France,' 3me Série, Tome ii., 4me Trimestre; by the Society. 'Verhandlungen des Zoologisch-Botanischen Vereins in Wien,' Band iii. 1853, Band iv. 1854; by the Society. 'Entomologische Zeitung' for March and April, 1855; by the Entomological Society of Stettin. Trachodes hispidus, one specimen; by F. Plant, Esq., of Leicester. Trachodes hispidus, one specimen; Lina ænea, two specimens; Callistus lunatus, two specimens; by F. Bates, Esq., of Leicester.

Exhibitions.

Mr. Crewe exhibited two specimens of Notodonta cucullina bred from the eggs.

Mr. Stevens exhibited six specimens of Notodonta carmelita reared from the eggs; also five specimens of Aleucis pictaria, taken within the last week at Dartford Heath.

Mr. Foxcroft sent for exhibition three specimens of Endromis versicolor, taken by him in the birch wood, Fincastle, Perthshire, on the 18th of April.

The Rev. W. H. Hawker exhibited a specimen of the very rare Cloantha perspicillaris, taken in a spider's web at Ashford, Hants; and two specimens of Argynnis Lathonia, captured in that locality.

Mr. Stevens exhibited a Dicranocephala, taken in China by Mr. Fortune, which was thought to be distinct from D. Wallichii.

Mr. Newman exhibited three species of the Australian genus Deretaphrus, described in the Appendix to the 'Zoologist,' p. 207, all of them remarkable for the excavation in the prothorax, from which the genus received its name: he added that an admirable description and summary of the characters of this curious genus, from the pen of that accomplished Coleopterist, Mr. Wollaston, was prefixed to the descriptions of the species.

Mr. Newman also exhibited two beautiful specimens of that rare Australian beetle, the Diphyllocera gemellata of Westwood, admirably described and figured in our 'Transactions,' vol. i. p. 214, and tab. xxii. fig. 1. They have been most obligingly placed in Mr. Newman's hands by Mr. James Gibbon, together with an immense number of rarities and novelties collected by himself at Moreton Bay.

Mr. Newman also exhibited the unique specimen of Dohrnia miranda, one of the Australian Œdemeridæ, described by him at p. 133 of the Appendix to the 'Zoologist:' he wished particularly to invite attention to the perfectly anomalous structure of the antennæ of this insect.

Remarkable variety of Cynthia Cardui.

Mr. Newman also exhibited a specimen of Cynthia Cardui, showing a remarkable aberration from the normal colouring: it was taken on the 8th of September, 1851, at St. Lawrence, in the Isle of Wight, by Mr. George Ingall, who most obligingly placed it in Mr. Newman's hands, and enabled him to draw up the following brief description, which appeared at the time at p. 3304 of the 'Zoologist,' but the insect never having been exhibited to the Society, Mr. Newman thought it might be interesting:—

"*Upper side: fore wings.*—In examples of Cynthia Cardui in its normal state, the entire apical area is of a deep brown colour, approaching to black, and adorned with certain white markings, the chief of which is a large oblong white blotch, situated at about two-thirds of the costal margin, to which its upper extremity is closely approximate; beyond this are four subrotund white spots disposed in an irregular series, the first and fourth being considerably larger than those which are intermediate, and again, beyond these, and still nearer the apex of the wing, is a sinuous series of five slender white lunules: in the aberrant example the large white mark, as well as the lunules, are entirely absent; the four subrotund spots are present, but altered in form, and having indistinct and suffused limits: the lowest of the four is increased to treble its normal dimensions, and united to an equally large and similarly shaped white spot in the adjoining areolet, and again, in the next areolet, *i.e.*, the one still nearer the anal angle of the wing, is still another smaller round white spot: in normal specimens the fulvous discoidal area is blotched with very dark amorphous patches, in the aberrant example these are entirely absent, the discoidal area being uninterruptedly fulvous: in the normal state the black border of the anal portion of the external margin is of an intense dark brown, in the aberrant example it is much paler, and increased to double its usual width. *Upper side: hind wings.*—In normal examples of this species there is an interrupted band of dark brown markings across the discoidal area; nearer the exterior margin is a series of five round black spots, one in each of the open areolets, with the exception of that nearest

the anus; again, beyond this is a series of six elongate black lunules, one in each open areolet: in the abnormal example, all these markings are absent but nearly on the site of the five round black spots are five round pure white spots, of which that nearest the anal angle has an indistinct brown ocellus. The black marginal markings which, in the normal state, have been described as hastate, are in the aberrant example suffused and considerably altered in appearance. *Under side.*—This partakes, in a great degree, of all the remarkable aberrations noticeable on the upper side, but, in addition, the entire under surface has a washed or suffused appearance, all the distinctness or sharpness, so to speak, of the usual exquisitely beautiful marbled markings being obliterated."

Athous campyloides.

Mr. Newman also exhibited the three specimens of Athous campyloides taken by that indefatigable collector, the late Mr. Robert Foster, on the blossoms of elder, at Ramsgate, and described at p. 509 of the first volume of the 'Entomological Magazine.' Mr. Newman had lately submitted the specimens to the critical examination of Mr. Janson, and he believed no one understood our British Elateridæ so thoroughly, and Mr. Janson pronounced the species to be perfectly distinct from any other British Elater with which he was acquainted. The specimens are two males and one female; they differ considerably in size and colour, but evidently belong to the same species. Mr. Newman remarked that the time and locality were very inviting to out-of-door entomologists, and he hoped to incite some of his brethren of the net to a further search: the species, he observed, was probably Continental, as well as insular, but he knew of no other description than the one to which he had alluded. He added that, since he had been in the room, Mr. Dawson had shown him a specimen taken also at Ramsgate.

Death of Dr. De Haan.

The Secretary announced that the Council had been informed of the death of Dr. De Haan, one of the Honorary Members of the Society, at the age of fifty-four years.

Election of Members.

The following gentlemen were balloted for and elected Members of the Society:—Henry Ansell, Esq., Tottenham; John Matthew Jones, Esq., Welshpool; and Joseph Baly, Esq., Kentish Town.

Saturnia Ricini.

Mr. Douglas called the attention of the Society to the note by Dr. Boisduval, in the 'Annales' of the Entomological Society of France, on the Indian Saturnia, which feeds, in the larva state, on the castor-oil plant, the insect being quite distinct from S. Cynthia, with which it has been confounded, and Dr. Boisduval proposes for it the name of S. Ricini, after its food-plant.

Descriptions of new European Lepidoptera, Formicidæ, Diptera, Arachnida, &c.

Mr. Douglas also directed attention to the 'Verhandlungen' of the Zoologisch-Botanischen Verein of Vienna, containing many entomological articles of great interest,

including the following:—'On the First State of some Phycideæ;' by J. v. Hornig. The natural history of the following species is given:—

Gymnancyla canella (a rare British species). The larvæ feed, in September and October, on Salsola kali, eating the stems of the plant, and living under a whitish leathery web, which never contains more than one larva.

Spermatophthora Hornigii, *Led.* The larva feeds, in September and October, on the seed-vessels of Atriplex angustifolia.

Homœosoma binævella. The larva lives, in May and June, inside the flower-heads of Carduus Acanthoides.

Cryptoblabes Rutilella, *F.-v.-R.* The larva, which is very local near Vienna, lives in the autumn on alder bushes, changes to pupa at the beginning of October, and appears in the perfect state the following May.

There are also 'Descriptions of two new Geometridæ,' by Mann; viz., Psodos alticolaria and Geometra Beryllaria. 'Dipterological Fragments;' by Dr. Schiner and Dr. Egger. 'Contributions towards a Knowledge of Ants,' containing descriptions of several new species, by G. L. Mayr. 'Contributions towards the Monography of the Genus of Spiders, Dysdera;' by K. Doblika. A continuation of the 'Versuch, die Europäischen Spanner;' by J. Lederer. 'Notes on the Lepidoptera of Siberia;' by J. Lederer. 'On the Myrmicidæ, and a New Genus thereof;' by G. L. Mayr.

The Common Broom (Genista scoparia), *the food-plant of Anarsia Genistæ.*

Under this title Mr. Newman communicated the following note:—

"The following memorandum, placed in my hands by Mr. William Machin, of 35, William Street, Globe Fields, Mile End, will give our members an idea when and where to look for this scarce insect, the larva of which appears, from Mr. Stainton's 'Tineina,' to have been bred only from Genista tinctoria:—'Having collected a quantity of larvæ from the common broom in a number of localities, and placed them altogether in a breeding-cage, I reared from them, on the 6th of July last, two specimens of Anarsia Genistæ; thus proving not only the food-plant of the insect, but also that it appears in the perfect state in the beginning of July.'"

New Entomological Works.

Mr. Stainton informed the Meeting that Professor Boheman had recently published a Report on the Entomological Works and Papers of 1851 and 1852, which he characterised as very complete and effective: its title is 'Berättelse om framstegen i Insekternas, Myriapodernas och Arachnidernas Natural Historia för 1851 och 1852:' Stockholm, 1854.

Mr. Stainton also said that during his recent visit to Paris he had seen a very useful work, published by Mons. Leon Fairmaire and Dr. Laboulbène, entitled 'Faune Entomologique Française,' and containing descriptions of all known French insects: two parts of the Coleoptera are published, price five francs each.

Rectifications of Misstatements.

Mr. Westwood stated that he felt it necessary to make the two following rectifications of misstatements recently published in the Society's 'Transactions:'—

"I. In p. 58, vol. iii. New Series, Mr. Curtis has stated, in a foot-note, that the characters of Coniopteryx given by Mr. Westwood in the 'Introduction to the Modern

Classification of Insects' (Gen. Syn. p. 48), are copied from his 'British Entomology.' It will be necessary only to compare the characters given in these two works to see that this statement is unfounded: Mr. Westwood's original detailed description (accompanied by drawings of the anatomical details of the genus) was, moreover, read at the Entomological Society five months before Mr. Curtis published his description, and the insect was referred by Mr. Westwood to its legitimate family, whereas by Mr. Curtis it was incorrectly placed in the family Psocidæ; whilst Mr. Stephens, who had, in fact, first pointed it out as a genus, referred it to a different order."

"II. In page 134, vol. iii. New Series, Mr. Smith has described the Formicideous genus Stenamma, which he assigns to Mr. Stephens as its author; that author, however, had no other share in its establishment than that of indicating its existence in his Catalogue (p. 356), as follows:—

'Genus 92: (666) ——
4838. † 1. Westwoodii mihi. In Mus. D. Westwood.'

The fact simply being, that knowing that Mr. Westwood possessed a new British ant, which the latter regarded as a distinct genus, he thought fit to notice its existence, identifying it with Mr. Westwood's insect by attaching his name to it specifically. The name and characters of the genus were first given in the 'Introduction to Modern Classification.' Mr. Smith states, moreover, that there are no other differences separating Stenamma from Myrmica than the three-jointed labial palpi (in Myrmica they are four-jointed), the importance of which character Mr. Smith endeavours, perhaps with reason, to disprove. But, in the 'Introduction' (ii. p. 219, 226, and Gen. Syn. p. 83), Mr. Westwood has described and figured the structure of the mandibles and maxillary palpi, which entirely disagree with those of Myrmica, proving the insect to belong to the same section as Myrmecina and Polyergus."

Mr. Stainton read the following note:—

The Occurrence of the Small Genera of Tineina in Tropical Countries established.

"The question has frequently been asked, whether the small genera of Micro-Lepidoptera, Lithocolletis, Nepticula, &c., which are so plentifully represented in these temperate regions, did not also occur in tropical climates. Those who had collected abroad denied their occurrence there, because they had never seen them; but this was a negative proof which merely established that they had not been observed, not that they did not occur there; and to observe these small genera a special education is absolutely necessary; the eye which has been trained to detect an Ornithoptera on the wing at the distance of a quarter of a mile, cannot at once, and without previous practice, notice a Nepticula at the distance of a few feet.

"I have for some time entertained the opinion that, if the exotic Micro-Lepidoptera are to be collected, it must be by some entomologist who has learned first to collect insects of that group at home, and who then carries his home-bred skill into distant regions. I regretted that when Mr. Wallace and Mr. Layard were in this country neither stopped here long enough to learn the habits of our Micro-Lepidoptera: among the species of Microptera collected in Ceylon by Mr. Layard were several belonging to the family Elachistidæ, and I could scarcely doubt that a short training in this country would have enabled him to have discovered many smaller species.

"In August last Mr. Atkinson (well known as the captor of Gastropacha Ilicifolia) forwarded me some mines and larvæ of Phyllocnistis saligna and P. suffusella, and at the same time informed me he was about to start for Calcutta. I regretted to lose a useful correspondent in this country; but it directly struck me that here was an opportunity of obtaining information of East Indian Micro-Lepidoptera, which might prove of great importance to us, and I begged Mr. Atkinson to pay particular attention to any indications he might fall in with of the existence of the smaller genera in India.

"On the 6th of April I had the pleasure of receiving a letter from Mr. Atkinson, with the agreeable information that he had already detected the mines of three different species of Lithocolletis, of one of which he had reared the perfect insect, and of this species he has forwarded me some mines in the upper side of the leaves of Bauhinia racemosa, which I now exhibit; for this species, which, in the perfect state, has some affinity with our L. trifasciella, Mr. Atkinson proposes the name of Lithocolletis Bauhiniæ.

"I think this important discovery will be useful in urging upon those who may hereafter be likely to visit our colonies the necessity of completing their education in this branch of entomological science before they leave home, as I am satisfied that a skilled Micro-Lepidopterist in unexplored regions would, with the greatest facility, obtain novelties without end, and would also be able to observe the habits and transformations of the greater part of his discoveries, so that he would at once add to our knowledge as well as to our collections."

The President doubted if Micro-Lepidoptera would be found so plentiful in tropical countries as Mr. Stainton anticipated; for, even in the South of Europe, through which, in company with Mr. Walker, he made a tour some years ago, although they collected diligently, and sought especially for Micro-Lepidoptera in places similar to those in which they were plentiful in England, yet, out of more than six thousand specimens of insects they brought home, the number of small moths was very few. If Micro's were abundant in the tropics we should surely have had more of them sent to us.

Mr. Saunders said that when he was in India he gave very little attention to the small Lepidoptera; but he saw the mines of their larvæ in leaves, and he remembered that many small moths used to come to the lights at night.

Small Coleoptera in the Tropics.

Mr. Waterhouse said it used to be thought that tropical countries produced but few Micro-Coleoptera; but this was an error, for Mr. Darwin had brought from South America great quantities of minute beetles, collected chiefly just after the rainy season.

Mr. Westwood said Helfer had collected in India thirty species of Anthicus, besides many other small beetles, now in the collection at Prague.

Mr. Baly said Mr. Fry had in his possession a drawer-full of minute Staphylinidæ from Brazil.

'*On the Entomostraca of South America.*'

Under this title Mr. Lubbock read a descriptive paper, accompanied by drawings of the species.

A new Species of Agrotis.

Read the following description, by Mr. Henry Doubleday, of a new species of Agrotis taken in Britain:—

"Agrotis Ashworthii. *Alis anticis cinereis, strigis tribus denticulatis atris, maculâ quadratâ nigrâ inter stigmata, posticis fuscis.* (Exp. alar. 1 unc. 5—8 lin.)

"Anterior wings cinereous, powdered with black atoms, with three denticulated strigæ arising from black spots on the costa; one near the base, a second before, and a third beyond the middle of the wing. Between the stigmata (which are very indistinct) is a quadrate black spot, and another between the anterior stigma and the second striga; a fuscous cloud crosses the centre of the wing as in Tæniocampa populeti, T. instabilis, &c.; cilia fuscous. Posterior wings fuscous in both sexes, with the cilia paler; head whitish; thorax cinereous; abdomen pale fuscous; antennæ fuscous, white towards the base.

"This pretty species, which appears to be quite unknown upon the Continent, was discovered at Llangollen, North Wales, by Mr. Ashworth, in the summer of 1853, and the specimen forwarded to me for inspection. Last summer many specimens were taken by Messrs. Cooke, Gregson, &c., as noticed in Mr. Stainton's 'Entomologist's Annual,' where the insect is figured under the name of Spælotis Vallesiaca. The figure, however, is by no means good, the anterior wings being much too broad.

"I forwarded a specimen of the male and a drawing of the female to my friend, M. Guenée, and he says that he believes it to be quite new; I have therefore named it after its discoverer: it is closely allied to A. lucernea, A. decora, &c."

Part iv. vol. iii. New Series, of the 'Transactions,' published in April, was on the table.

The President announced that Mons. Alex. Yersin, of Morges, Canton de Vaud, Suisse, is engaged on a Monograph of the Gryllidæ and Locustidæ, and solicits the loan of British species.

June 4, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Korrespondenz-Blatt des Zoologisch-mineralogischen Vereines in Regensburg,' Achter Jahrgang, 1854; by the Society. 'Proceedings of the Royal Society,' Vol. vii. No. 12; by the Society. 'The Zoologist' for June; by the Editor. 'Revue et Magasin de Zoologie,' 1855, Nos. 2, 3 and 4; by the Editor, M. Guérin Méneville. 'Annales de la Société Entomologique de France,' 3me Série, Tome ii. 1er, 2me et 3me Trimestres; by the Society. 'Journal of the Society of Arts' for May; by the Society. 'The Literary Gazette' for May; by the Editor. 'The Athenæum' for May; by the Editor. 'Contributions to Fossil Entomology' (from the 'Quarterly Journal of Proceedings of the Geological Society'); by the Author, J. O. Westwood, Esq. A

selection of Indian Insects from the Himalayan district, consisting of many fine and rare species of several orders; by S. P. Pratt, Esq. Some small insects sent from Ceylon by Mr. Thwaites; by W. Spence, Esq.

Election of Members.

Herr Dohrn, President of the Entomological Society of Stettin, and William Atkinson, Esq., F.L.S., F.Z.S., F.R.B.S., &c., were balloted for and elected Members of the Society.

Exhibitions.

Mr. Stevens exhibited a splendid specimen of Ornithoptera Brookiana, the new species recently captured in Borneo by Mr. Wallace, and of which the description was read at the April Meeting of this Society.

Mr. Foxcroft sent for exhibition a box of Coleoptera, recently taken in Perthshire, including a single specimen of the very rare Dendrophagus crenatus, and a bred specimen of Anarta cordigera, with a pupa and puparium: of the latter he says, "They are found made up on the sunny side of stones or on the bark of birch trees; but the perfect insect selects the side of the stone or tree away from the sun."

The President exhibited the insects presented by Mr. Spence, and read the following extract of Mr. Thwaites' letter addressed to that gentleman:—

"One of the bottles contains the larvæ and imagos of a Carabideous beetle which infests the nests of a little black ant, a few of which are in the bottle. The other little bottle contains a lot of tiny species of insects of all kinds, amongst which is the pupa of a little Papilio, sent me by a neighbour as 'a most wonderful natural production,' and which, viewed through a lens, has a most extraordinary resemblance to a monkey's head."

The President also read the following note, addressed to him by Mons. Charles Delarouzée, of Paris:—

"In removing an old butt, which had served many years to hold water, to water the garden, it occurred to me that some insects might be found under it; and absolutely, by examining the earth carefully to the depth of three feet, and in the decayed wood of the butt, I took an individual of Euplectus sulcicollis, *Redt.*, and many examples of Anommatus 12-striatus and Langelandia anophthalma. I suppose that the Anommatus is a parasite of the Langelandia: probably, by searching in similar places, you might ascertain the fact."

The President observed that the insect described by Stephens as an Anommatus was the Aglenus brunneus of Gyllenhal and Erichson. He believed that the Anommatus had not yet been discovered in England.

On Saturnia (Hyalophora) cecropia.

Under this title the following note, by W. S. M. D'Urban, Esq., of Newport, near Exeter, was read, and the cocoons alluded to exhibited:—

"Having seen in the reports of the Proceedings of the Entomological Society, during the last twelve months, many notices relating to the silk of Bombyx Cynthia,

and that several persons have discovered means whereby the glutinous substance which fastens the threads together may be dissolved and the silk unwound, I am inclined to think that several other Bombyces meet with undeserved neglect, and especially the subject of these notes, which appears to be well adapted for introduction into England, since it is a native of a climate subject to severe alternations of temperature; and the larva feeding only in July and August, it would not be at all affected by the cold of this island, as most of the other foreign species of Bombycidæ are. If we add to this that it produces an immense quantity of a very strong material, and that its food-plants flourish well in England, we have all the requisites to constitute a valuable silk-producing insect. During my residence in Canada I had several opportunities of observing its transformations; but I regret I did not determine *accurately*, from *my own* observation, its food, as only one of its splendid larva, and that a full-fed one, came into my possession: this larva was picked up crawling across a road at Sorel, Lower Canada, on the 19th of August, 1849, and was confined in a small basket covered with gauze: after many fruitless attempts to effect its escape it finally settled itself in the middle of the handle of the basket, and there began spinning its cocoon (No. 1) the same evening, which, however, it did not complete till the third or fourth day after, being engaged in spinning, with scarcely any intermission, during the whole of that time. Having been kept in a warm room through the winter, it was evolved on the 7th of April, 1850, seven months and nineteen days from the commencement of its cocoon. In its natural state, however, it does not make its appearance till June, remaining, therefore, nearly ten months in the pupa. The cocoon (of which the accompanying specimens are examples) contains an immense quantity of silk, and is double—a wise precaution against the severity of the Canadian winters: the outer case is of a very close and stiff texture; but the inner or true cocoon is rather finer, and is covered on the outside with a quantity of rough silk, whilst the side next the pupa is very smooth and polished. Could it be made useful it would be a great boon, as it must be a durable material indeed to resist the wind and rain of ten months, or of even two or three years, as I have found these cocoons adhering as strongly as ever to the tree the following spring after the escape of the moth.

"Even if the cocoons could not be unwound they might be carded and spun in the same manner as they do those of Bombyx Cynthia, &c., in India. These cocoons are common about Sorel and Montreal, and still more so about Toronto, in Upper Canada, and are very easily found, as they are spun on the smaller branches of various trees, and are very conspicuous when the leaves have fallen: they are most abundant on maple, but I have found them also on apple, fir, &c., and on palings and dead stalks of weeds. It appears to feed on a variety of plants, and amongst others I have reason to think on the choke-cherry (*Prunus serotina*), of which several plants, reared from seed sent from Canada, are now flourishing in the garden here, and could be grown to any extent required. I have seen it stated that it feeds on the wild American plum (*Prunus pennsylvanica*), and that it has been occasionally reared on apple-leaves. There would, therefore, be no trouble in finding food for it in this country; and I do not think there would be much difficulty in introducing it, as the cocoons could be gathered in any number in Canada and the United States, and sent home by steamer, packed in air-tight boxes, as sea air, from my own experience, seems to be fatal to them. It would be hardly possible to send the eggs across the Atlantic, as only two months intervene between the appearance of the moth and

the larva going into cocoon, it is manifest the eggs must be hatched soon after they are laid: these eggs are large and oval in shape, and pure white. If the moths, when bred in England, could be got to pair, there would then be no further obstacle in obtaining a supply of silk by the end of the following August after their arrival.

"This and the other magnificent species of Saturnia inhabiting North America present a strange appearance, when darting past in the dusk of a summer's evening, and are extremely difficult to capture, unless they happen to be found at rest during the day. Mr. Gosse does not appear to have been acquainted with this fine moth, for, although he mentions several other species of Saturnia in his 'Canadian Naturalist,' he does not notice it.

"In conclusion, should the subject be thought worthy of the consideration of this Society, I shall be happy to obtain cocoons from Canada, and forward some to any entomologist wishing to make the experiment."

References to numbers attached to the cocoons were read.

Office of the Wing-rays of Insects.

Read, a paper by Mr. Newman, intituled 'A Memorandum on the Wing-rays of Insects,' in which the author maintains, in opposition to the published views of Herold, Kirby & Spence, Oken, Westwood and other distinguished entomologists, that the wing-rays are the supports of the membranous portion of the wing, and in all respects the analogues, although not the homologues, of the wing-bones of the bat, and that the passage of air, blood and nerves through their channels is simply a provision of Nature for their maintenance in a healthy and efficient condition. He supported this view by a reference to experiments and observations on living insects, and also by the anatomical researches of Chabrier and Bowerbank, which he had himself verified.—*J. W. D.*

NOTICES OF NEW BOOKS.

'*The Annals and Magazine of Natural History.*' Nos. 89 and 90, dated May and June, 1855; *price* 2*s.* 6*d. each.* London: Taylor and Francis, Red Lion Court, Fleet Street.

No. 89 contains the following papers:—

'On the Structure of Chlorophyll.' By Hugo von Mohl. [Translated from the 'Botanische Zeitung' for February 9 and 16, 1855, by Professor Henfrey.]

'Notice on the Question of the Presence of an Operculum in the Genus Diplommatina of Benson, and Description of a New Species. By W. H. Benson, Esq.

'Short Characters of some New Genera and Species of Algæ discovered on the Coast of the Colony of Victoria, Australia.' By W. H. Harvey, M.D., M.R.I.A., &c., Keeper of the Herbarium of the University of Dublin.

'Some Remarks on Vegetable Placentation.' By John Cleland, Esq.

'On the Attitudes and Figures of the Morse.' By Dr. J. E. Gray, F.R.S., V.P.Z.S.

'Descriptions of Eight New Species of Birds from South America.' By John Gould, Esq., F.R.S.

'On the Impregnation and Germination of the Algæ.' By Dr. Pringsheim. A copy of Dr. Pringsheim's researches on these obscure but interesting subjects, lately laid before the Berlin Academy, having been forwarded to Professor Henfrey, together with a request that he would make them known in England, that gentleman has prepared this paper, which is a brief and very compressed abstract, for publication in the 'Annals.'

Bibliographical Notices:—'A History of the British Marine Testaceous Mollusca, distributed in their Natural Order;' by William Clark. 'The Ferns of Great Britain,' illustrated by John E. Sowerby: the Descriptions, Synonyms, &c., by C. Johnson. 'First Steps in Economic Botany, for the Use of Students;' by Thomas Croxen Archer. 'The Entomologist's Annual for 1855;' edited by H. T. Stainton.

Proceedings of Learned Societies:—Royal—Linnean—Zoological—Botanical of Edinburgh.

Miscellaneous:—Origin of Wheat [extracted from the 'Gardener's Chronicle' for March 10, 1855]. Mr. Busk's Anomalous Shell; by Professor J. S. Henslow. On the Fructification of the Arachis hypogæa; by Hugh M. Neisler [extracted from 'Silliman's Journal' for March, 1855]. On the Structure of the Starch Granule; by Mr. Grundy [extracted from the 'Pharmaceutical Journal' for April, 1855]. Description of a New Species of Aulacorhamphus; by John Gould, Esq., F.R.S. [extracted from the 'Proceedings of the Zoological Society' for February 22, 1853].

No. 90 contains the following papers:—

'Monograph on the British Species of Phalangiidæ or Harvest Men.' By R. H. Meade, F.R.C.S.

'On the Structure of Chlorophyll.' By Hugo von Mohl. [Translated from the 'Botanische Zeitung' for February 9 and 16, 1853, by Professor Henfrey. This paper is now concluded.]

'On Perna quadrata of Sowerby.' By John Lycett, Esq.

'Notes on the Ornithology of Madeira.' By Edward Vernon Harcourt, Esq.

'On the Characters which distinguish the Vegetation of a Country.' By M. Alphonse De Candolle. [Translated from the 'Bibliothèque Universelle de Genève' for December, 1854.]

Proceedings of Learned Societies:—Zoological—Royal.

Miscellaneous:—On Phœnicura Tithys; by Dr. Jordan. On the Transmission and Metamorphoses of the Intestinal Worms; by MM. Milne Edwards and Valenciennes [translated from the 'Comptes Rendus' for April 30, 1855, p. 997.] Note on Trichomonas vaginalis of Donné; by MM. Scanzoni and Kolliker [translated from the 'Comptes Rendus' for May 7, 1855, p. 1076.] On a Lunar Vapourbow: by Charles Clouston.

This is an unusually valuable number, containing three papers of interest to the zoologist; but I cannot help regretting that so much space should be occupied by extracts from other journals which almost every naturalist in Britain has on his study-table: in the present number I count twenty-seven pages of such extracts, besides sixteen pages of Proceedings of Learned Societies, which the said Societies themselves circulate amongst us. The papers to which I wish particularly to invite attention are, Mr. Meade's 'Monograph of the Phalangiidæ,' Mr. Harcourt's 'On the Ornithology of Madeira,' and Dr. Jordan's 'Note on Phœnicura Tithys.' Mr. Meade has done us good service by the publication of his Monograph: it is careful, lucid, and, I doubt not, conscientiously accurate: it describes five species of Phalangium, of which one, Phalanguim minutum, is new; two of the new genus Megabunus of Meade, of which one, M. insignis, is new; four of Opilio, of which one, O. agrestis, is new; one of Leiobunus; two of Nemastoma; and one of Homalonotus. As a friendly criticism I may add that the description of a new species, Phalangium minutum, from two specimens, "one immature," and of both of which the sex and habitat are unknown, is rather a dangerous precedent. Dr. Jordan's paper recites the various instances of the occurrence of the black redstart in the West of England, which have already been made known to ornithologists in the earlier numbers of the 'Zoologist.' The following notice of its habits is interesting:—"It seems always active in search of Diptera, on which it evidently feeds, and one reason for its preference for the cove by the Parson and Clerk rocks is, that a collection of the larger olive-leaved sea-weeds is generally heaped up there for manure; on this heap flies abound in

mild weather throughout the year. The attachment to locality is, however, very marked in this species: they will be seen not only in a particular spot, but on a particular stone in that spot; they are fond of perching on some prominent point of rock, and from this they sometimes dart out upon any passing gnat, much after the manner of a flycatcher." Dr. Jordan speculates on the question, Why should this bird be a winter visitor, and the common redstart a summer visitor, in South Devon? but he adduces no evidence as to the direction in which the species is passing when arrested in its passage on the southern coast. A multiplicity of observations, or rather records of observations, respecting Sylvia Tithys seem quite to harmonise with, or at least not to disturb, the theory I have long since submitted to ornithologists, that there is a uniform movement among migrants, *southward* in the autumn, *northward* in the spring. Nothing is more probable than that the later individuals should be deterred, by the great breadth of sea, from crossing from the Devon and Cornish coast, especially as Dr. Jordan points out that there is a supply of food there throughout the winter: even as far eastward as Brighton, and all along the intermediate coast, the same facts obtain; but still further eastward, where the narrowness of the channel offers a facility to this feeble-winged bird for crossing, it is not found during the winter months, although occasionally observed on its southward passage in autumn, and on its northward passage in spring.—*E. N.*

The Natural History Review. No. VI., dated April, 1855; *price* 2*s.* 6*d.* London: Highley.

We notice with pleasure that this periodical has now obtained a London publisher, but still must be regarded as purely Irish in character, and as bearing the most direct and indisputable evidence to the zeal and industry of Irish naturalists. It contains 'Reviews,' 'Notices of Serials,' 'Communications made to Irish Societies,' and 'Proceedings of Irish Societies,' and is conducted in a spirit of fairness and with a display of critical acumen which are highly praiseworthy. It certainly seems a little remarkable that while the meetings of Irish Societies are reported thus carefully and regularly *in extenso*, not only in this 'Review,' but also in local newspapers, that in England such reports rarely appear in print: if we except the Entomological Society of London, reported in the 'Zoologist,' what

English Society is fairly represented by the literary press of England? We do not vouch for the value of all the papers read before Irish Societies; we think that, in many instances, the authors might with advantage study a little, previously to appearing in print, not only "How to observe," but "What to observe;" but we do assert and will maintain that these detailed reports are extremely useful, and doubly useful is the periodical which collects them with such care, and preserves them with such impartiality.

The following papers, read before Irish Societies, appear in the present number:—

'Notes on some Familiar Facts connected with Sounds and Hearing.' By R. Dowden, Esq.

'On Pectunculus Glycymeris, and on the Local Range of Molluscous Animals, traced with the Dredge.' By Dr. Farran.

'On a Species of Annelidæ new to Ireland.' By William Andrews, Esq.

'Remarks on the Percidæ and Serrani, with an addition to the Ichthyology of Ireland.' By William Andrews, Esq.

'Directions for Capturing Lepidoptera.' By the Rev. Joseph Greene.

'On the Probable Occurrence of the Lepidopus argyreus in Dublin Bay.' By Dr. Ball.

'On Cricetus phæus.' By Dr. Carte.

'Capture of Anthocharis Belia in Worcestershire.' By J. Walter Lea, Esq.

'Notes on the various Insects captured or observed in the Neighbourhood of Dingle, County Kerry, in July, 1854.' By A. R. Hogan, Esq.

'On Fungi parasitic on Insects; with particular reference to some lately-discovered Irish Specimens.' By E. P. Wright, Esq.

'Descriptions of Insects figured, and references to Plates illustrating the Notes on Kerry Insects.' By A. H. Haliday, Esq., M.A.

'On a Crustacean of the genus Hyas.' By J. Grainger, Esq.

'On Collecting and Arranging British Mollusca.' By E. P. Wright, Esq.

Two of these papers only require a passing notice:—

1st. The capture of Anthocharis Belia in Worcestershire. With respect to this and the simultaneously recorded capture of Pieris Daplidice in the same county, suffice it to make two observations: *first*, that we entertain not a shadow of a doubt that both statements originate in some error; and *secondly*, that the tone of the communication evinces a desire to maintain rather than amend the

error: the error implies carelessness—its attempted maintenance an unphilosophical spirit.

2nd. Mr. Haliday's 'Descriptions of Insects,' on the contrary, is a paper of the highest scientific interest and the most painstaking accuracy. The following species are described:—one Hymenopterous; Heptamelus ochroleucus, synonymous with Melicerta ochroleuca of Stephens, a Tenthredinidous insect which "seems to connect Blasticotoma Filiceti of Klug and the group with 9-jointed filiform antennæ. The number of areolets, the broad stigma, and original of the radial veinlet, agree in both genera. Peculiar to Heptamelus is the short pobrachial areolet, which in the Tenthredinidæ usually extends a good deal beyond the end of the præbrachial. In Plagiocera, also, they are conterminous; but the pobrachial is twice as long as the posterior discal; and that genus, belonging to the group with clavate antennæ, has little affinity in other respects to Heptamelus." One Hemipterous, of the family Lygæidæ, Dipsocoris alienus of Haliday, synonymous with the Cryptostemma alienum of Herrich-Schæffer. "Meyer doubtingly refers this insect to the Capsidæ, influenced probably by the supposed want of ocelli which both Meyer and Herrich-Schæffer have overlooked. It seems to me better," continues Mr. Haliday, "to place it for the present with the Lygæidæ, in a peculiar section, next the Anthocorini, and approaching, perhaps, to the Capsidæ, with both of which it has considerable likeness in the wings; although the dilated and imbricated sutural margin of the hemelytra is peculiar to it, and the rather short, detached proboscis makes some approach to the structure of the Reduvidæ. On the whole, Hylocharis is probably the nearest allied native genus. In its habits it most resembles the Saldæ, but shuns the light more than they do." It "inhabits the banks of rivers, throughout the summer, gliding among the wet gravel, its silky down protecting it from the wet. It takes flight readily, even from the surface of the water. The yellowish larvæ and pupæ are found in the same situation, leaping like the perfect insect." Five Dipterous, Clunio marinus, a new genus and species of Chironomidæ, found on gravelly sea-coasts below high-water mark, walking with its wings half raised and in rapid vibration, without taking flight; Dolichopus prætextatus and Aphrosylus celtiber of the family Dolichopidæ; Geomyza cingulata of the family Muscidæ; and Canace nasica of the tribe Ephydrini.

'*Mollusca Testacea Marium Britannicorum. A History of the British Marine Testaceous Mollusca, distributed in their Natural Order, on the Basis of the Organization of the Animals; with References and Notes on every British Species.*' By WILLIAM CLARK. London: Van Voorst. 1855. 536 pp. 8vo. Price 15*s.*

THIS is just one of those books that we take up to study, rather than to criticise. It is full of information—full of the result of deep, reflective, patient study: a considerable portion has already appeared in the 'Annals and Magazine of Natural History;' but the author, having calculated that four years would be occupied in completing the entire work in that journal, and considering it would be almost presumptuous in him to calculate on being able to watch the publication during so long a period, determined on printing the whole in a collective form. There are no plates and no descriptions of shells: these wants Mr. Clark considers supplied by his continued references to Forbes and Hanley's 'British Mollusca.' No one can peruse this important volume without perceiving that the question of the scientific importance of the shell is now tested in the most severe manner; the animal has long been gradually crawling into importance; but we were scarcely prepared to see a dozen species dwindle into one, because, however different the shells, the animals were alike. A graver question is opened up than at first meets the eyes: Mr. Clark, by his own labours, is placed in direct antagonism to Forbes and Hanley, whose work on the British Mollusca he himself applauds, and concerning which a phrase of unqualified approbation has been stereotyped for the use of all future commentators. We proceed to prove this antagonism; it were unjust simply to record the impression made on ourselves by a perusal, however attentive. We close the book, and it opens spontaneously at p. 342: we proceed to quote:—

"L. RUDIS, *Donovan.*

"L. rudis, Brit. Moll. iii. p. 32, pl. 83, f. 1, 2, 3, 5, 6, 7, and pl. 86, f. 1.

"L. patula, Brit. Moll. iii. p. 36, pl. 85, f. 6—10, animal, pl. G G, f. 2.

"L. tenebrosa, Brit. Moll. iii. p. 39, pl. 84, f. 11, 12, and pt. 85, f. 1, 5.

"L. saxatilis, Brit. Moll. iii. p. 43, pl. 86, f. 45.

"L. fabalis, Brit. Moll. iii. p. 49, pl. 86, f. 2, 3.

"L. palliata, Brit. Moll. iii. p. 51, pl. 84, f. 8, 9, 10."

From this citation we have purposely omitted irrelevant references: confining ourselves to Forbes and Hanley's recent work, we find that six of their species are thrown overboard without hesitation, and we may add that four more species, zonaria, rudissima, jugosa and neglecta of other authors, are sent to keep them company. The author proceeds:—"To describe the varieties enumerated above, which are the pseudo-species of authors, would be to say that the organs of all, both internal and external, do not vary in the slightest degree in form: the only differences are modifications of colour, size, and in the striæ, depending entirely on habitat."

Thus, we are told, Forbes and Hanley devote nineteen pages of letter-press and twenty-three figures to a species which "*does not vary in the slightest degree in form.*" We have already said we take up the book to study, not to criticise, and we make no attempt to gainsay an assertion made so unhesitatingly; but a conclusion certainly forces itself upon us that these conflicting authors are unintentionally and unwittingly making sad havoc of our Natural History: no two books, written in the worst spirit of dogmatic controversy, of editorial heart-burning, ever contradicted each other more flatly, or advocated more opposite views, than these which, like a pair of turtle-doves, wing their amiable way from the same nest: never was criticism so crushingly severe as Mr. Clark's passing commentary on this dozen species of Littorina.

The truth of the matter lies hid in the fact that naturalists are not agreed as to "what to observe:" we have good books on "how to observe;" but unless we know "what" to observe it is of little moment that we learn "how" to observe it. The difficulty experienced by the compilers of works on the Mollusca is that they have to consult two classes of authorities, first, the conchologists, secondly, the malacologists—classes which are made to represent two different sciences, and it seems to us that we shall never arrive at just conclusions until these sciences merge in one. Entomologists experience a somewhat similar difficulty in the larva and imago, but—and, as it appears to us, wisely—avail themselves of the characters of both, in order to attain just conclusions. We do not say that the larva and imago are in any respect the analogues of the animal and shell; but the naturalist, in both cases, is presented by Nature with two classes of phenomena: is it wise of him to ignore either? From every page of Mr. Clark's volume we learn, as clearly as though printed in scarlet, that he considers the shell of no importance whatever in the study of the Mollusca: he utterly ignores it in the larger divisions—he utterly ignores

it in species. Yet, we may ask, on what characters, excepting those of the shell, were those very genera founded which he adopts throughout his work? and if we are right in supposing that these genera were founded on characters of the shell alone, and are serviceable in a system dependant alone on the characters of the animal, does not this coincidence not only prove that the characters of shell and animal vary in unison with each other, but that the shell is a most important guide when the animal is injured, imperfectly preserved, absent or altogether unknown? We wish to know so much of nature, and really know so little, that we should rejoicingly avail ourselves of every assistance she may offer.

We must, however, confess to a great leaning towards that principle, which, indicated in everything Mr. Clark has written, tends to elevate physiological over physical characters as the basis and starting-point of system; and we behold, in imagination, the dawning of a new era in science, to be distinguished by a reference to causes rather than a studying of effects; by an observation of functions rather than of organs; by noting the stages by which a being arrives at maturity rather than by the mensuration of parts when mature. The idea, however, although, as we have said, indicated in all that Mr. Clark has written, does not originate with him; Adanson, Lamarck, Poli, De Blainville, Gray and Swainson have done much the same thing, making physiological characters the foundation of their several systems. It does, however, become a most important question, and it is one on which we range ourselves among the non-contents, whether the shell, which we are content to throw over in the classification, is also to be ignored in the discrimination of species. To us it seems, as the colouring of the bird, as the striping and spotting of the cat tribe, useless in the formation of primary groups, but all-important in the discrimination of species. A word more: Mr. Clark's terms are not sufficiently definite and precise; he is either careless in phraseology, or adopts technicalities of which he does not know the exact import: thus, in the very outset, his system, founded on sexual organization, is rendered obscure, by his using the word "dicœcious" in a sense exactly opposed to the received one: this fault is not uncommon among those authors who go somewhat ahead of the rank and file of their brother naturalists, but it is nevertheless a grave one. He who promulgates new ideas should be particularly careful to explain them with perspicuity and precision. With these reservations we cordially recommend Mr. Clark's volume to the study of naturalists.

Remarkable act in an aged Cat.—There is at the present time (April, 1855) a cat, twenty-five years old, belonging to the Government House, New Brunswick, who has seen three successive Governors: this cat, who, from her venerable appearance, is called "Granny," a few weeks since produced a single kitten: she was much delighted with her offspring, and nourished him with the greatest care for one month. Another cat in the house then brought forth six kittens: as soon as Granny became aware of the fact she took up her son in her mouth, carried him to her neighbour's dormitory, and deliberately dropped him into her box. This feat accomplished, Granny began immediately to disport herself, gambolling all over the house, and from that time has never taken the smallest notice of her kitten: meantime the other cat gave a warm welcome to the intruder, and has brought him up with the same tenderness as her own. It is a laughable sight to see the foster-mother with her half-grown son and her own kittens. No wonder Granny was tired of a young family, but the anecdote shows she was in full possession of her faculties.—*Communicated by a resident at New Brunswick, through G. S. Kett, Esq., of Brooke, Norfolk.*

Occurrence of Honey Buzzards (Falco apivorus) *near Scarborough.*—A fine female specimen of this bird was shot at Flamborough on the 2nd of June: the stomach was full of frogs, slugs, &c.; the ovary did not contain eggs in a very forward state. A most beautiful adult male—a remarkable variety of this variable hawk—was also shot about the same time at Louth, in Lincolnshire: both specimens were bought by C. W. Shepherd, Esq., of Luddesdon, Kent, who has forwarded them to me to be preserved.—*Alfred Roberts; King Street, Scarborough, June* 14, 1855.

Occurrence of the Snowy Owl in Aberdeenshire.—Mr. Green has just shown me, in the flesh, a fine male specimen of the snowy owl, shot in Aberdeenshire on the 24th instant, and sent to him to be preserved.—*Edward Newman.*

An Owl laying an Egg after twenty years' confinement.—Having kept a female tawny owl (*Strix aluco*) in my possession nearly twenty years, she is now in perfect health, and, to my great surprise, laid her first egg yesterday.—*Henry Spurr; Westfield House, Scarborough, April* 24, 1855.

Ornithology of the Diggings.—We are quite in the Bush, and have innumerable birds of all sorts and sizes flying about; most beautiful parrots, parroquets, cockatoos by hundreds, and magpies by thousands: the noise made by the latter exactly resembles the tune of "Merrily danced the Quaker's wife," but they never get any further than "Merrily danced," and this over and over again, in all keys, is incessantly kept up all day, and sometimes at night too: then there is the laughing jackass, a bird that makes a horrid noise; bush turkeys, which fly very high; wild ducks, cranes, swallows, pelicans, crows, curlews, moorpawks, that say "Moorpawk" quite as plainly as our cuckoo says its name; but my favourite is a black swan with a white neck; it is all black except the neck, which is a dazzling white, and makes finer swan's-down than our English bird: it is a rare bird, flies very high in the air, and walks most majestically; one which settled near me the other day reminded me of the second Mrs. Dombey, so proud, firm and dignified; they tried to shoot it, but did not succeed.—*F. Woodroffe; Jeffrey's Dairy Station, near Kyneton, Mount Macedon, Victoria, Australia, January* 3, 1855.

Hen's Egg with Double Shell.—At page 4703 of the 'Zoologist' a correspondent appeals to your readers to corroborate a fact which he communicates concerning a double-shelled hen's egg. I have much pleasure in stating that an egg precisely similar to the one he describes was brought under my notice in March last by Mr. Burrell, poulterer, at Hastings, in whose possession the curiosity was. I do not at this moment recollect, although I took a note of it at the time, the exact weight and dimensions of the egg; but I think the weight was something like six ounces, and the measurement was something extraordinary. The hen which produced this monstrosity was a cross between a Malay and a mongrel Dorking. For the rest, the description supplied by your correspondent would apply equally to the egg to which I have referred.—*Edward Vernon Harcourt;* 20, *Portland Place, London, May* 9, 1855.

Extraordinary Hen's Egg.—The singular freak of nature recorded under this heading in the 'Zoologist' (p. 4703) is not, I think, of such very unusual occurrence as your correspondent seems to suppose. About two years since I was shown a very large egg, laid by one of the Dorking fowls, which contained a perfectly shelled egg inside, and I believe the remains of a second yolk in a fluid state; the interior egg and the fragments of the outer one I preserved, being the first instance of the kind I had ever met with. During that year I was told, on good authority, of a similar abnormity in a duck's egg; and I have lately heard of another hen's egg laid in the same manner.—*H. Stevenson; Norwich, June* 20, 1855.

Occurrence of the Little Ringed Plover and Smew near Brighton.—In February last my brother and self succeeded in obtaining several specimens of the little ringed plover (*Charadrius minor*), and also a very good specimen of the female smew (*Mergus albinus*), along the sea-coast between Cuckmere Haven and Seaford.—*G. Grantham;* 47, *Western Road, Hove, May* 19, 1855.

Occurrence of the Bittern and Goosander in Northamptonshire, and of the Red-throated Diver in Plymouth Sound.—On the 5th of January I shot a remarkably fine bittern (*Botaurus stellaris*) from a small brook below the village of Aldwinkle, in Northamptonshire. I only mention this, as the bird is excessively rare in the county; the last instance of its occurrence in Northamptonshire with which I am acquainted was near the same place, about twenty-five years ago. I saw and pursued a female goosander (*Mergus merganser*) for several days in January last, on the river Nen, in Northamptonshire; it was afterwards shot by our game-keeper, and is now in my possession, stuffed. I shot a specimen of the redthroated diver (*Colymbus septentrionalis*) in the Sound here, on the 5th instant. Is this not very late for this bird in these parts? This specimen had a few red feathers in the neck.—*T. L. Powys; Mount Wise Barracks, Devonport, May* 16, 1855.

Occurrence of Buonaparte's Gull (Larus Buonapartii) *on the Irish Coast.*—On Wednesday, the 14th of February, 1855, Captain Watkins, a brother officer of mine, shot a gull on the coast near Skerries, about seventeen miles north of Dublin, which is pronounced by all the Natural History Societies of Dublin to be Buonaparte's gull (*Larus Buonapartii*), of whose occurrence I believe there are but two previously recorded instances in Great Britain. The bird has been preserved and mounted by Mrs. Baker, of Grafton Street, Dublin, and is now in Captain Watkins's collection.—*Id.*

Supposed insensibility of Reptiles to Poison.—In a recent number of the 'Zoologist' (Zool. 4705), one of your correspondents makes some remarks on the insensibility of reptiles to strong poisons, and instances a case of the common water-newt, as not suffering from the effects of "several strong doses of Prussic acid." This may perhaps occur among the Batrachia, but it is certainly otherwise with the viper, the only reptile that I have hitherto tried this poison upon. Last June, when in Devonshire, I procured a fine lively viper, and, wishing to preserve the skeleton entire, a difficulty arose as to the means of killing the animal without risking injury to any of the bones: it struck me that poison might be usefully employed for this purpose, and some Prussic acid of Scheele's strength having been just received from London for medicinal purposes, I at once proceeded to administer it. Holding the viper near the head with a stick, I put the bottle of acid to his lips; but, being unable to force open his mouth, I was induced to try another plan, and left him alone, with a single drop of the poison resting on the nose: these gentle measures succeeded better than the more forcible ones, for presently he protruded the tongue, and, on withdrawing it, carried the poison into his mouth: the effect was instantaneous; the viper began snapping furiously, rolled over on his back, and twisted about with the most violent contortions: in less than a minute a slight muscular contraction of the body, on being taken up, was all that remained of the vital powers that but a short time before were so actively displayed. The question of the effect of poisons on serpents, especially that of poisonous bites inflicted on them by similar or allied species, is one about which we have much to learn, and difficulties arise in drawing just conclusions from accidental cases, from the fact that the tooth of the assailant may perhaps penetrate some vital part, and death will be the consequence, without the application of the injected venom. Some cases that have occurred in the Zoological Gardens seem to bear on this point: in one instance a puff-adder was bitten through the head by his companion, and died; another was bitten on the back, and, although apparently suffering in consequence for a time, it lived for some months after, and ultimately died from other causes.—*E. W. H. Holdsworth;* 26, *Osnaburgh Street, May* 16, 1855.

Supposed unnoticed character in the Angler or Fishing Frog.—With reference to Mr. Thomson's notice (Zool. 4705) of the leaf-like appendages on the body as well as on the head of Lophius piscatorius, I may observe that they are distinctly, although perhaps not very accurately, represented in the figure of that species at the head of the article in the second edition of Yarrell's 'British Fishes,' though the author appears to have omitted mentioning them in his detailed description, except as being found around the head. I had an opportunity, with many others, of examining this fish soon after its arrival, when its extraordinary appearance and many curious characters made it a general subject of regret that it had not survived its journey from the coast. I mention the second edition of 'British Fishes,' as that is the only one that I have by me; but, as the fish in question is so well known, the figure is probably the same in the first edition of that work.—*E. W. H. Holdsworth;* 26, *Osnaburgh Street, May* 16, 1855.

Salmon and Salmon Fry.—Knowing the interest you take in all that relates to Natural History, I would, had my time permitted, have sent you a memorandum before now of a very interesting meeting which took place at the salmon-breeding

pond, a few miles above Perth, on Wednesday, the 2nd inst. The hatching-troughs connected with the pond were stocked with ova during the season before last, and these were successfully hatched in the course of the spring of 1854. The young fry speedily became inmates of the capacious pond, in which they have continued ever since, and where they are now in excellent condition. The pond is very judiciously constructed, being not only ample, but of various depth, with a fine pure sparkling stream running through it night and day. It corresponds entirely in its character to any natural expanse of the river Tay, on the bank of which it is formed. Many of the young fish enter the supplying stream, and sport there in the current. You are aware that two objects have been kept in view by the promoters of this experimental pond; first, to increase the breed of grilse and salmon, by raising securely an additional supply of parr, which are the young recruits from which the marketable fish are eventually obtained; and, second, to ascertain, by a renewed and enlarged experiment, open to the inspection of the public, whether these parr assume the silvery aspect and general condition of *smolts* (on becoming which they speedily migrate to the sea) after the completion of their *first*, or not till the termination of their *second* year. Mr. Andrew Young, of Invershin, a person of great experience, maintains that the *smolting*, and consequent seaward journey, take place in about a year, that is, that the fry hatched in the spring of 1854 will become smolts, and seek the sea, in that of 1855. This, of course, if the correct view, would be the more agreeable, because advantageous, one for the artificial breeder, in so far as, in the rearing of his young fish, he would save a year's care and keeping; and where there is only a single pond, that pond might be emptied of its contents each season, and the newly-hatched fry let down into it, soon after their predecessors of a year old had been allowed to take their departure to the sea. On the other hand, Mr. John Shaw, the first who *demonstrated* that parr, commonly so called, were the fry of salmon, and remained for a long continuance in the river waters, maintains that these small fishes do not become smolts, nor seek the sea, till after the completion of their *second year* from the time of hatching; so that, in his opinion, the genuine smolts of this spring were hatched in the spring of 1853, while the parr of last year's hatching will not grow into smolts, nor migrate seawards, till the ensuing spring of 1856. I desire now to state to you, very briefly, the result of our recent examination of the contents of the pond, and the conclusion come to. We saw many thousands of these parr, with sufficient distinctness to receive a correct impression of their actual state; and we, moreover, netted a sufficient number of *samples* for a closer and more minute examination. Although these fish are now about thirteen months old, *there was not a single smolt among them.* They corresponded entirely to the year-old parr which we took from the river for comparison. The only example of a *smolt* exhibited to the meeting throughout our prolonged and careful inquiry and investigation of several hours, was one caught by Dr. Eisdale, of Perth, *while angling in the river Tay.* He brought it up to us immediately, and when set alongside the parr from the pond, its greater size and spotless silvery lustre made its difference obvious to all. The meeting came to the distinct and unavoidable conclusion that the inhabitants of the pond *were still parr;* and Lord Mansfield, especially, and very properly, pressed for their being detained in confinement for another year, for the sake of a complete and conclusive experimental demonstration that these so-called parr take two years to become smolts. In this view Mr. Shaw (who was present) and myself cordially concurred. We did not hear a dissentient voice; and not a syllable was said about a single smolt having been seen in the pond:

their continued captivity was therefore determined on.—*James Wilson; in 'Witness' Newspaper.**

Note regarding the Name of the Australian Trap-door Spiders.—In the January number of the 'Zoologist' (Zool. 4561) there is an inquiry, from the Rev. A. Hussey, respecting the name of the Australian spiders which form their habitations in the ground, with a movable entrance. This question cannot be determined, unless specimens of the spider itself could be procured and examined by a competent Arachnologist, which I believe has never yet been done. Spiders which construct burrows in the earth furnished with a moveable lid have been found in different parts of the world, as Jamaica, Barbary, the Island of Naxos, Montpellier and Corsica, besides Australia; and, although a good deal has been written regarding them, authors are not quite agreed as to the names of the species. I may refer Mr. Hussey to the 'Bridgewater Treatise,' written by the late Mr. Kirby, who gives a plate containing figures of the nests constructed by two of these species, which he denominates Cteniza fodiens and C. nidulans: he also gives an interesting description of the construction of the nests or tubes. He refers to a memoir published in the Annals of the Entomological Society of France (vol. ii. p. 69), by M. V. Audouin, who mentions four species of the genus Cteniza, *Latr.* (only a subgenus of Mygale, according to Walckenäer), all of which construct these trap-door retreats. Mr. Westwood read a memoir before the Entomological Society of London in 1840, respecting a living spider, which he received from Barbary, said to possess this curious instinct: it was afterwards published in the 'Annals and Magazine of Natural History' for February, 1841, but I have not the volume by me: he referred the specimen to the genus Sphodros of Walckenäer; but the latter naturalist doubts the accuracy of his statement, in consequence of all the species of Sphodros with which he was acquainted being natives of America (Walckenäer, Hist. Nat. des Insectes Aptères, tom. ii. p. 440). The Australian species probably belongs to a different genus from any of the others, and Walckenäer says that perhaps it may be identical with his Missulena occatoria, a name given by him to an Australian spider (loc. cit. vol. i. p. 253), with whose habits he was unacquainted.—*R. H. Meade; Bradford, February* 21, 1855.

Gonepteryx Rhamni double-brooded.—I am requested by several of my entomological friends to offer a few words in answer to Mr. Newman's remarks under this head (Zool. 4706); I should otherwise have considered as superfluous any addition to Mr. Bree's list of authorities and conclusive remarks upon the subject. By applying the term "double-brooded" to G. Rhamni I endeavoured to convey the impression that, as far as my own observations went, there were two broods of this insect in the year. I did not add any "further comment," because, the same fact having been already noticed by several authors, I was unwilling to trespass upon the good nature

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* Communicated by A. White, Esq., of the British Museum.

of the Editor of the 'Zoologist,' by lengthening unnecessarily my already long article: I should otherwise perhaps have hazarded a suggestion, or rather a query, as to whether this insect, in *favourable* seasons, may not be somewhat similar in its appearance to such insects as Thyatira batis, which "keeps on coming out" through a great portion of the summer. I say "favourable seasons," for in ordinary seasons its general appearance is confined to the two flights, in spring and autumn, which, as Mr. Bree says, no one doubts. My observation of G. Rhamni on the Continent resulted in my having an impression that the above might be the case, but I cannot, at present, speak with sufficient accuracy as to whether it is so or not. It appears to be an established and undoubted fact that, in this country, many of the spring specimens of this insect are in "perfectly fresh and brilliant condition," as noticed, not only by the "practical entomologist" mentioned by Mr. Bree, but also by every entomologist whom I have consulted on the subject. With regard to the ragged specimens one meets with in winter and early spring, no one, I believe, ever doubted their having hybernated. They present to the eye the same "faded state" which Mr. Westwood, in his splendid work, notices in similar veteran specimens of Vanessa polychloros. Any supposition that Mr. Newman may not have had such opportunities of observing G. Rhamni as some of the practical country entomologists is at once set at rest by his remarks, for it is plain that he has enjoyed the most enviable opportunities of studying this insect. Had I ever been so fortunate as to visit the "happy hunting-ground" in which this beautiful butterfly is to be found all the year round, as Mr. Newman describes, I should, in my limited knowledge of Entomology, have been more inclined to have called it "hundred-brooded" than have cavilled at the term "double-brooded" being applied to it; for, as one of my correspondents, an "eminent Lepidopterist," after writing as follows—"Surely there is a spring hatch of G. Rhamni, as well as an autumn one, and a Christmas-day specimen would differ from an April one; and if Mr. Newman has taken note of the condition of many *April* specimens, he must be an active pedestrian, if not '*Aliger*' himself," very aptly adds, "and if he has seen it on 'New Year's-day, and almost every succeeding day in the year' (except with a pin through it), his locality must beat all 'Forests of Bere' out of the field; and the climate realize the 'ver perpetuum' of the poets." Well, upon the face of the acknowledged fact that many of the spring specimens are "perfectly fresh and brilliant," we are now told by Mr. Newman that "his conviction, his firm conviction" is that there is only one brood, an autumnal one. We therefore have it asserted, with all the authority of the late President of the Entomological Society, that the brimstone butterfly, emerging from its chrysalis in the autumn, not only survives the winter (which no one doubts), but, after laying its eggs, continues to enjoy a vigorous existence until the eggs it has laid are hatched, the larvæ fed up, and the chrysalides ready to burst; in short, that the period of its existence is a year; and that all this knocking about the world has rather improved its personal appearance than otherwise. We shall thus have insects approaching nearer to the condition of birds, and shall be led to look for perfection in a specimen (at least of Gonepteryx Rhamni), not as soon as posssble after its appearance from the chrysalis, but rather to wait until it attains to its full adult winter or spring plumage. And now, I beg respectfully to submit that it is Mr. Newman who has made an "interesting and important discovery," and one which, if established, would tend to overthrow all one's preconceived opinions as derived from one's own observations, aided by reference to standard works, upon the economy of insects,

especially butterflies; and would deprive of half their meaning the lines of that beautiful poem ('The Butterfly's Birth-day'), which say

> "When bursting forth to life and light,
> The offspring of enraptur'd May,
> The butterfly, on pinions bright,
> Launch'd in *full* splendour on the day.
>
> "Unconscious of a mother's care,
> No infant wretchedness she knew;
> But as she felt the vernal air,
> At once to *full perfection* grew."

Having thus directed Mr. Newman's attention to the more important part of the subject, it would be superfluous to add the reasons which induced me individually to call, and for the present still to consider, Gonepteryx Rhamni "double-brooded."—*William Henry Hawker; Horndean, Hants, June* 21, 1855.

Capture of Nomada borealis at Gosforth, Northumberland.—I have taken a fine series of females and two males of that beautiful bee Nomada borealis: they are parasitical upon Andrena bicolor, and were entering its burrows when captured. The locality was a slippery bank of dry friable clay, in a pine-wood, at Gosforth, and the time the latter end of April,—one of those cold gusty days (of which we have had so many), relieved only occasionally by a gleam of sunshine; and it is somewhat curious that I have not taken a specimen since, although I have watched the locality on sunnier and more "likely" days.—*Thomas John Bold; Angas Court, Bigg Market, May* 31, 1855.

Tenacity of Life in a Bembidium.—Yesterday, when collecting Bembidia on the shingly borders of the Thames, I observed a curious-looking insect endeavouring to get out of a small hollow left in the mud by the removal of a pebble. On closer examination I found the mysterious object to be the head, thorax and two fore-legs of Bembidium concinnum, which had, no doubt, been severed from the remainder of its corporation in scraping over the shingle with my digger. About five minutes afterwards I encountered the trunk and remaining limbs of this unfortunate insect, and finding them quite dead, turned again to the fore-quarters, which were as active, on being touched, as if no injury had been sustained: the strength and vigour of this portion seemed unimpaired, but, from the impossibility of maintaining the balance, it repeatedly rolled back to the bottom of the cell, not being practised in the *pas de deux*. I marked the spot with a forget-me-not (a rather appropriate mark), and examined the living fragment at intervals of five minutes; it was quiescent till disturbed, but then became very active: this continued up to three-quarters of an hour from the time of first observing it, and in another five minutes all motion had ceased; it seemed as if its powers had failed suddenly. I mention this incident, because it seems to me somewhat singular that the fore portion should be so much more retentive of life than the rest of the frame in those races in which that portion is not the principal seat of the nervous mass; in the Vertebrata the case appears very different. I ought to mention, however, that one of the elytra seemed to indicate that some further injury had happened to that portion than the mere separation.—*George Guyon; Richmond, Surrey, June* 20, 1855.

Marine Vivaria.—I beg to draw your attention to a fact which, although probably well known, has never, that I am aware, been published in any remarks on vivaria: I allude to the fact that plants will live in water without the compensating balance of animal life. My study-window faces North-east, and I have at the present time five show-glasses filled with salt water, and two and a globe filled with fresh water. The following is the state of the marine portion:—No. 1 was three-parts filled, last June, with water, and a few animals, that I had under examination, and some weeds placed in it; the animals and weeds died: I left it still in the window, and two-thirds of the water has evaporated; there is, notwithstanding, a healthy growth of Enteromorpha, and the surface is covered with air-bubbles: the water, as in all, is perfectly sweet. No. 2 was filled in August last, and a small gurnard placed in it: as the water evaporated it was filled up to its original level with fresh water; the gurnard was killed by the severe frost, and the water left: no weeds were placed in this glass, and the dead gurnard was taken out: the water has evaporated to half, and there is now a luxuriant growth of Enteromorpha, much thicker and more forward on the side next the window. No. 3 was also filled with sea water in June last, but nothing placed in it: in the course of a few days a growth of green weed appeared. In July or August last I placed in it a small mullet: this mullet died near the end of the last frost, and the water has been since left; it is now covered with a growth of weed, but not to the extent of the last; it has, however, a thick coating on the bottom, and a small quantity of film floating on the top: the mullet fed on the weed. No. 4 was filled, in March last, with weeds and a few of the smaller Serpulæ and Annelides: these last I by degrees took out, leaving nothing but the weeds: all these are alive and doing well, and the sides of the glass jar are covered with patches of green weed; the weeds evolve oxygen in large quantities, and the top of the water is covered with patches of air-bubbles. No. 5 contains water which I made putrid by throwing in dead animal substances, until it became black and stunk insufferably; I then filtered it several times through filtering paper, in which was placed a quantity of powdered charcoal, until I at length obtained it scentless and crystalline: I left it in a room away from the window until to-day, and on examining it I find a slight growth of weed round the edges of the bottom: the taste of this water is slightly pungent. In all these glasses the sole animal life is a few minute Entomostraca, such as Cyclops and Cypris. Now, if carbonic acid is evolved solely from animals, whence comes the necessary quantity for the plants in my glasses? The facts are exactly as I have stated them; and another fact that I have observed appears to point to a solution; it is this—if you watch the glasses during the morning, and as long as the sun does not shine on them, you will find all at rest. There are the plants, and there is the water, but no air-bubbles; but watch it when the sun shines on the glass, then you will find that, one after another, the little bubbles form and rise to the surface, and this lasts until the rays of the sun cease to shine on the glass. Should the sun, as at this present moment, be hidden by clouds, the bubbles cease forming, but to recommence on his appearance. From what I have said it appears to me that I shall be justified in assuming that the direct light rays of the sun possess and exercise the power of forming sufficient carbonic acid, or some other chemical combination, for the well-being of plants, and thus far supplies the want of animals.—*William Thompson; Weymouth, May* 28, 1855.

Notes on certain British Hydrocantharidæ.

By the Rev. Hamlet Clark, M.A.

"Things hoped for" is a subject which deserved, and has already received, your attention. There are many things among Coleoptera for which we have been "hoping" for the last twenty years: with your kind assistance as editor our wants perhaps may be supplied, and at length we may hope to find.

My object in writing to you is to point out some of the enigmas which exist among British Hydrocantharidæ, and also to ask for the good aid of your readers, in endeavouring to obtain solutions.

Haliplus fluviatilis. Schaum (Zool. 1889) detects two British specimens in Mr. Wollaston's cabinet, the locality of which is unrecorded. It appears to be a river species, having been taken freely in the Seine by M. Aubé, and by M. Chevrier among Confervæ in the Rhone: the species has probably been overlooked as a variety of H. impressus, which it closely resembles.

H. Sanmarkii. I have little doubt that this will prove a variety of that most inconstant of Hydropori, rivalis: I notice it, however, as the question may readily be set at rest by any one who is in the habit of taking this latter species. I have never seen a specimen which exactly corresponds with Aubé's description of Sanmarkii, though several examples in my cabinet of rivalis approximate to it.

Hydroporus opatrinus. The sole authority for this as a British species appears to be "Netley, Salop," taken by the Rev. Mr. Hope. Steph. Man. ii. 193, Appendix. Has it ever been taken in this or any other locality since 1829, the date of that capture?

H. ferrugineus. Stephens (Man. ii. 193) gives near Collingbourne wood once in 1828, and several in a stream at Kimpton, during the spring of 1829. This insect is allied to Memnonius, and appears to be generally distributed, occuring also in the lake Constance.

H. Scalesianus. A pair were taken by the late R. Scales, Esq., in Norfolk, previous to 1828; one specimen of these is in Stephens' cabinet: the species has not since occurred. It has been taken in great abundance by M. Erichson, at Berlin, and according to Schaum (Zool. 1893) is very local. Mr. Scales resided at Beechamwell, near Swaffham, Norfolk, and his home collecting-ground was a high chalk district: although I have visited that country during three summers in search of this insect, my then ignorance of these facts is quite sufficient to account for my entire failure.

Hydroporus unistriatus. I have seen but one example, taken many years ago in a chalk-pit, on the Madingley road, near Cambridge. Stephens gives London and Devonshire as its localities: it is generally distributed throughout the continent.

Hydaticus stagnalis. Not common; although occurring throughout the Continent. I shall be glad to hear of any modern localities in Britain (Steph. Illust. ii. 86).

Agabus serricornis. By Mr. Hope, "at Netley, rare." There is no reason why this insect may not occur in Soctland or the Orkneys, as plentifully as in the north of Europe, Sweden and Lapland.

Cybister Rœselii. This beautiful species is found in most countries of Europe, though the single recorded instance of its capture in England is in 'Stephens Illustrations,' at Walton, Essex, at the end of September, 1826.

I feel that I need not apologise for sending you this list: it appears to me not only to suggest practical matter for investigation to the working entomologist, but to be of some little interest by pointing out how far the labours of the present generation of Coleopterists have been surpassed by those of the former: in this group at least we are obliged to confess to the probability that our known Fauna of good species is not so extensive as in 1830. I fear that among the Helophoridæ and Hydrophilidæ, when they are properly understood, our position will be found to be even more unsatisfactory.

Might I venture to invite especially the attention of our Scotch entomologists, and of naturalists who are proposing tours into the Highlands, to the subject of this paper? I am confident that any one who will carefully examine the water-beetles of those districts will be amply rewarded by the discovery of new species. During a visit of only a few days in the autumn of last year, I was fortunate in taking, *inter alia rarissima*, a new Hydroporus at Oban, and a new Dytiscus in Mull; both species (as are some six others, at present unknown to us), common in Lapland. I shall be happy to supply exact details and directions to any one who wishes to examine these localities, or to any one who may propose to search the waters of his neighbourhood any information in my power. It is only by the united labours of many that success in the investigation of any department of insect life can be attained; but especially in this case, when, as in these groups, peculiar habits forbid general distribution, and the lives of generations of a species are confined to the limits of one solitary lake or moor. This stimulates the efforts of the individual lover of Nature, for by his researches he can enrich others, and this rewards combina-

tion, for thus the knowledge of each consists of the results of the united labours of all.

HAMLET CLARK.

Northampton, June 23, 1855.

Entomological Botany (with more especial reference to the Plants frequented by the Tineina). By H. T. STAINTON, Esq.

(Continued from page 4457).

Rhamnus Frangula. Alder Buckthorn.

Speyer enumerates as feeding on this plant Psyche Viciella and Agrotis ravida; Bruand is silent respecting the food-plant of the former, and the latter is stated by Freyer to feed on various low plants, especially the species of Rumex; it appears, therefore, questionable whether either of them has any partiality for the Rhamnus. The Continental Dosithea incanata is stated to feed on this plant, but the larva does not appear to have been observed by any entomologist since the time of Hübner. The larva of Hyponomeuta plumbellus has been reputed to feed on this plant, but there is reason to believe this supposition was erroneous.

The above is a very good sample of the amount of scrutiny that Speyer's compilation requires, in order to ascertain the proper degree of confidence to be placed in it; as Pisistratus Caxton says, in 'My Novel,' *à propos* to "Knowledge is power," *Never quote second-hand.*

However, there is one Micro-Lepidopterous larva which *certainly* feeds on Rhamnus Frangula, and may be found thereon in August— this is Bucculatrix Frangutella: the larva, when young, mines the leaf in concentric circles, as shown in the annexed wood-cut; after a time it ceases to mine in a continuous curve, and flies off at a tangent; it is then about to quit the mine, after which it changes its skin, and then feeds on the leaf externally, at first only eating the leaf half through, but subsequently making holes in the leaf.

Ulex Europæus. Common Furze; Gorse.

An unpleasant plant to search for larvæ amongst, as it is very difficult to do so without pricking the fingers and trying the temper of the collector. Much probably remains to be done before the entomological treasures of this plant can be considered exhausted. The larva of Catoptria ulicetana, which, in the perfect state, swarms on furze bushes all the summer, is reputed to feed on the seeds, where it finds as a bedfellow the Coleopterous Oxystoma Ulicis. Two of the Depressaria larvæ feed on this plant in June, D. costosa and D. umbellana; the larva of the former is brown-black, and feeds on the flowers and the young tender shoots; it is, like many of its congeners, very active: the larva of D. umbellana we have not yet succeeded in finding, and I cannot therefore point out to the collector wherein it differs from that of D. costosa. Of the omnivorous genus Gelechia only one species is known to feed on this plant, viz., Gelechia mulinella: it has an epicurean taste; it enters the unexpanded flower-buds in April, through a hole it makes in the hinder petal; it then discusses at its leisure the stamens and anthers, and proceeds to a neighbouring bud to repeat a similar dainty meal. Anarsia Spartiella, in the perfect state, frequents Ulex as well as broom, and it is probable that the larva feeds also on the shoots of this plant. The original discovery of Œcophora Lambdella is thus recorded by Donovan:—"has hitherto only been taken on Epping Forest: the brood was discovered on a furze-bush, by Mr. Bentley, an eminent collector of insects, in July, 1789; the cabinets of several naturalists have been supplied from the parcel then taken, as the species has rarely been observed since." Whilst we are groping completely in the dark to discover a larva, any ray of light, however feeble, should always readily be thankfully received, and as this insect is, at the present day, only taken singly, the record that a large number were taken in one furze-bush nearly seventy years ago may assist us by indicating that the larva feeds on some part or other of the Ulex. The Œcophora larvæ feed, almost without exception, on decayed wood: the presumption is therefore great that, to find the larva of Œcophora Lambdella, decayed stumps of furze should be carefully examined. The larva of Butalis grandipennis, discovered by Mr. J. F. Brockholes, of Birkenhead, feeds in winter and spring on this plant; but, as his observations show that it is more partial to the Ulex nanus, it is mentioned more fully under the latter plant. Of the genus Coleophora only one species is yet known to be attached to the Ulex, namely, Coleophora

albicosta: the larva may be found in autumn and spring, but its case closely resembles a dried calyx of the plant, and it requires a very close scrutiny in order to distinguish it. One Lithocolletis, ulicicolella, frequents the furze, and no doubt the larva feeds on it, but hitherto we have failed to find it; indeed, the Germans have far outstripped us in their skill in finding Lithocolletis larvæ in Papilionaceous plants, and at present we are quite laggards in the race.

Ulex nanus. Dwarf Furze.

Probably most insects which feed on Ulex europæus feed also on this, but the observations of Mr. Brockholes and Mr. C. S. Gregson show that the larva of Butalis grandipennis has a decided preference for Ulex nanus. This larva may be found from January to April, in little webs near the stems of the twigs of the Ulex: an idea of the appearance which a shoot assumes, when furnished with a web made by one of these insects, may be gathered from the annexed woodcut. Within the last week I have found on this plant at Dartford Heath a fat greenish larva, inhabiting a more opaque white web, and which I am disposed to think must be the long-sought larva of Depressaria umbellana.

Genista tinctoria. Dyer's Weed.

Speyer mentions as feeding on this, Thecla Rubi, Anthrocera Minos, Hadena Genistæ and H. contigua, Calocampa exoleta and C. vetusta, Hemithea cythisaria and Boarmia crepuscularia. In May and June the shoots are contorted by the larvæ of Gelechia lentiginosella, which may then be collected in abundance, and at the same time the larvæ of Depressaria atomella may be met with, and the larvæ of Gelechia vorticella, and a little later the larvæ of Anarsia Genistæ; at the beginning of June the shining black cases of Coleophora vibicella should be sought for on this plant. Coleophora

Wockeella, which was suspected of feeding on Genista tinctoria, feeds on Stachys hirta, and perhaps on some other species of Stachys (hirta not being a British plant).

Genista anglica. Needle Whin.

More generally distributed, I believe, than the preceding species, but we are unacquainted with any larvæ that feed on it.

Sarothamnus scoparius. Broom.

This plant, which seems to have a great partiality for railway banks, is probably on that account much more plentiful with us than formerly, and the broom-feeding species ought, in consequence, to be of more frequent occurrence. The number of insects which feed on broom is very considerable. Speyer enumerates Thecla Rubi, Polyommatus Argus, Lasiocampa Quercus (though this is too polyphagous to deserve special mention), Hadena Genistæ and H. contigua, Mamestra Pisi and M. Chenopodii, Calocampa vetusta and C. exoleta, Angerona prunaria, Geometra papilionaria, Hemithea cythisaria, Crocallis elinguaria, Boarmia crepuscularia, Speranza conspicuaria, S. spartiaria (not yet detected in this country, but closely allied to S. conspicuaria), Chesias spartiata, Cabera strigillaria, Eubolia mœniaria (the new species figured in the 'Entomologist's Annual' for 1855), Pellonia vibicaria (formerly, like Trochilium Chrysidiforme, a *reputed* British species), Acidalia aversata, Botys cinctalis and B. limbalis (the latter not yet known as British).

Of the Tineina the following may be mentioned:—Depressaria assimilella, feeding in March and April, and fastening together several twigs, not by the tips, but in the middle of their length; D. costosa and D. atomella, feeding on the leaves and flowers in May and June; Gelechia mulinella, feeding in April, in the same way that it feeds on the flowers of Ulex Europæus (Cleodora cytisella, though named after the broom, we suspect is attached to the common fern, *Pteris aquilina*); Anarsia Spartiella, feeding in the shoots; Gracilaria Kollariella (not yet found in this country) feeds on this plant, as well as on Lotus corniculatus, mining the leaves; Coleophora saturatella, the larva full-fed at the beginning of July,—the black case has numerous short projections; Lithocolletis scopariella no doubt feeds on this plant, but we have not yet detected either the larva or the mine; Cemiostoma spartifoliella forms tracks beneath the bark in winter and spring, and its snow-white cocoons may be found on the branches in May; and lastly, Trifurcula immundella is so manifestly

attached to the broom that the larva must feed on some part of the plant.

Cytisus Laburnum. Laburnum.

Though no British plant, yet it grows well in most gardens, and there is a very fine tree of it in Torwood; the leaves are mined in July and autumn by the larvæ of Cemiostoma laburnella.

Ononis. Rest-Harrow.

As feeding on this genus of plants, Speyer enumerates Polyommatus Alexis, Polia tincta, Calocampa vetusta and C. exoleta, Heliothis Ononidis (a Noctua intermediate between dipsacea and scutosa, but not yet known as British) and Fidonia ononaria (which appears to be confined to the South of Europe).

Ononis arvensis. Trailing Rest-Harrow.

In May the larvæ of Pterophorus phæodactylus may be found abundantly on this plant.

Ononis spinosa. Spinous Rest-Harrow.

Speyer enumerates as feeding on this species Heliothis marginata, (of which Guenée remarks "not rare, but rather difficult to rear"), Eupithecia centaureata and Pterophorus calodactylus, by which name, I believe, he means our P. acanthodactylus, which has on several occasions been taken rather freely amongst rest-harrow, though I am not aware that the larva has been found on that plant. Gracilaria Ononidis mines the leaves of this plant in April and May, but hitherto it has escaped the researches of all the Micro-Lepidopterists of this country, the perfect insect having only been taken by sweeping.

Medicago falcata. Yellow Sickle Medick.

Speyer mentions as feeding on this, Lasiocampa Trifolii and Euclidia Mi.

Medicago sativa. Lucerne,
Medicago lupulina. Black Medick,
Medicago maculata. Spotted Medick,

Are not known as the food of any special species, but they are all plants deserving of careful observation.

Melilotus. Melilot.

Speyer mentions the following as feeding on this genus of plants: Polyommatus Alexis and P. Argus, Agrotis rectangula (a scarce South European species), Euplexia lucipara (the larva of which is pretty nearly polyphagous), Mamestra suasa, Strenia clathrata, and the Anthrocera Meliloti (which obtains its name from these plants).

Trifolium. Trefoil.

As the Papilionaceous plants are the favourite food of most of the "little blues," as well as of the Anthroceræ, and several feed with avidity on more than one of this tribe of plants, a good deal of repetition must necessarily ensue, and yet we may be far from mentioning *all* the larvæ which feed on any individual plant.

Speyer gives as feeding on this genus, Polyommatus Adonis, Anthrocera Minos, Loniceræ, Filipendulæ (and the non-British Scabiosæ, Meliloti and Peucedani), Dasychira fascelina, Lasiocampa Trifolii, Triphæna orbona, Mamestra Pisi, Acontia solaris (which latter, however, Guenée gives as feeding only on Convolvulus), and Euclidia Mi.

Trifolium pratense. Purple Clover.

Speyer enumerates as feeding on this species, Orthosia litura, Euclidia glyphica, Aspilates palumbaria and Larentia bipunctaria. It is on this plant that I am inclined to suspect the larva of Coleophora Fabriciella feeds, but up till now, neither in spring nor in autumn, neither on the leaves nor on the seeds, have we been able to find any Coleophora larvæ. Gelechia anthyllidella is not uncommon on this plant.

Trifolium medium. Zigzag Clover.

This is one of the plants on which the larva of Lithocolletis Bremiella has been met with in July and September: this brilliant species, almost surpassing in beauty L. lautella, is not yet numbered amongst our British species; the larva mines the under side of the leaf of T. medium, but is more partial to Vicia sepium and V. angustifolia.

Trifolium arvense. Hare's-foot Trefoil.

Cited by Speyer as a food-plant of Leucophasia Sinapis.

Trifolium procumbens. Hop Trefoil.

Probably the plant from which Mr. Gregson bred Coleophora deauratella (Zool. 4030). It is sad that a half-made observation like this should be allowed to relapse into obscurity.

Lotus corniculatus. Bird's-foot Trefoil.

Speyer mentions as feeding on this plant, Leucophasia Sinapis and Thanaos Tages. This plant is rather favored by the larvæ of Tineina, or probably it would be more correct to say that it has undergone more careful scrutiny; Gelechia ligulella feeds between united leaves in May, Gracilaria Kollariella mines the leaves in July, Coleophora discordella feeds on the leaves in autumn and May, and a Nepticula (not yet bred) mines the leaves in July.

H. T. Stainton.

Mountsfield, Lewisham, July 16, 1855.

Inquiries into the Philosophy of Zoology. By R. Knox, M.D., &c.

Part I. — *On the Dentition of the Salmonidæ.*

In the admirable volume of the 'Histoire Naturelle de Poissons,' in which my esteemed friend M. Valenciennes has discussed the natural history of the Salmonidæ, that distinguished naturalist lays down a doctrine that, in respect of the division of the Salmonidæ into genera or subfamilies, the dentition is the only natural-history character to be absolutely depended on, and that, in point of fact, it has never failed in his hands.

To arrive at this conclusion M. Valenciennes has been forced to exclude from all consideration the natural history of the young, alleging, what no doubt is true in a certain sense, that "the naturalist, as a naturalist, is concerned with or interested only in the adult." By this view, however, my friend embarrasses himself, without seeming to be aware of it, with the difficult question of *age*. Anatomists know well that the *adult* condition is not so easily determined even in mammals, and much less in fishes.

In accordance with views and researches conducted in this spirit, my esteemed friend arrives at the conclusion that the Salmonidæ now

living on the globe, form three distinct subfamilies or genera to be clearly and always distinguished by their dentition. To these three genera or subfamilies he appropriates the names of, 1st, Salmo, 2nd, Forelle or Fario, and 3rd, Salmo Trutta or Trout, names not new to naturalists, though new, perhaps, in their strict application to the three subfamilies of the Salmonidæ, long known and distinguished in Britain as salmon, salmon or sea trout, and trout. These subfamilies then correspond with the arrangement of many European naturalists who know them by the names of salmon, salmon-trout and trout: the salesman, on the other hand, speaks of the Salmonidæ as of two kinds only, — with him what is not salmon is trout,—regardless of affiliations with species higher or lower in the scale, he looks only to the market-value of the fish.

To understand the question at issue between M. Valenciennes and myself, I may first remark that the text of my friend is not clear; the engravings inaccurate and unworthy the high character of the work. It is difficult, as I have experienced, to get artists to copy exactly what is placed before them. The errors in the engravings alluded to must be ascribed to the artists employed; the obscurity in the text M. Valenciennes, no doubt, will himself explain.* Proceeding on principles directly opposed to those of M. Valenciennes, I select, as the starting-point of the inquiry, the dentition of the young of the Salmonidæ; one of the objects held in view being to ascertain whether it be correct to say, in all cases, that "the adult salmon is to be characterized by the persistence of certain vomerine teeth only; the forelle by the presence of others superadded to those of the salmon; the Salmo Trutta by the presence of a dentition wholly distinct from both." The whole of my researches are opposed to this view, which, although seemingly practical, is really not so. It may further facilitate the clear apprehension of the object and results of these inquiries, and their bearing on some important points in the Philosophy of Zoology, if I, in the first place, lay before my readers the dental formula arrived at by M. Valenciennes and subsequently the results of the inquiries I have made into this matter, from which I think it will be manifest to the scientific naturalist that the natural-history arrangement of the Salmonidæ adopted by M. Valenciennes is inadmissible.

1st. The true salmon, observes this distinguished naturalist, is cha-

* Whilst occupied with the correction of the proofs of this memoir, I have just been informed of the death of my most amiable and esteemed friend.

racterized by the presence of certain teeth, placed transversely on the fore part (*chevron*) of the vomer, the rest of the bone being edentulous.

2nd. The forelle or Salmo Fario of all countries and localities may at once be recognized and arranged by the presence of transverse teeth on the chevron of the vomer, and by a single row of teeth extending backwards along the body of the vomer, mesially.

3rd. The trout of all localities is known by a double row of teeth on the body of the vomer, the transverse teeth on the chevron or fore part of the bone being absent or but little distinct (*peu distincte*).

This arrangement is so simple, so clear, so seemingly practical, so easily understood, that one feels a reluctance to disturb it: it reminds me of the arrangement of serpents by their dentition, prior to the extension of the inquiry into the Indian species and those of the Japan seas; like it, the formula applied so well to certain genera of Europe and perhaps of Africa that it was the most natural thing in the world to believe it universally true; but it failed in presence of a more extended inquiry, as the natural-history arrangement of M. Valenciennes, in respect of the Salmonidæ, will be found to do.

I. Select a salmon of such a size, say 30lbs. weight, as to leave no reasonable question of its adult condition, and the dentition will, generally, be as follows:—

Upper jaw.—Maxillary and intermaxillary teeth. .	35 + 35	=	70
Palatal teeth.	17 + 15	=	32
Vomerine (called by some middle palatal) on the chevron 4; on the body, mesially and behind the others, 1 or 2.			6

Now these teeth of the vomer vary much, even in the adult, for sometimes there are none on the body of the vomer, and the transverse may be five in number or reduced to one or two.

In the lower jaw and on the tongue there are,

1st. Mandibular teeth.	18 + 18	=	36
2nd. Lingual teeth.	5 + 5	=	10

As the teeth of fishes, like those of serpents, are constantly being shed and replaced by others, the number of *fixed teeth* becomes unimportant as a natural-history character. Not so the number of mucous cavities destined to receive the teeth; these, no doubt, are constant and determined from the first. I reckon the dentition, therefore, by the number of these mucous cavities destined to receive

the teeth, and not by the number of teeth actually present. So long as these narrow mucous cavities are present, teeth either forming or fixed will be found in connexion with them: their absence implies that the dentition has been exhausted, and that the bone now edentulous will carry no more.

Now, examine the mouth of a true salmon of some 4 or 5 lbs. weight, and, in addition to the transverse teeth on the *chevron*, you will find a single undulating and somewhat irregular row of teeth extending backwards on the body of the vomer, varying in number, but always present. Were this specimen to be classed by the method of M. Valenciennes, it would be called a Forelle, Fario or sea trout, but we know it to be a pure salmon, though with the dentition of the Forelle. M. Valenciennes would no doubt say, "my formula applies only to the adult salmon, and this is evidently not an adult." I admit the force of the objection, so far as it goes, and shall proceed with my inquiry, at the same time remarking that the natural-history character, which not merely fails in recognising a salmon of 4 lbs. weight to be a salmon, but which, if attended to, would lead the naturalist to an entirely false view, cannot be viewed as one of any value.

Now, look into the mouth of a salmon about a foot in length, and the dentition of the vomer will be found to consist of, 1st, transverse teeth anteriorly on the chevron; 2nd, posterior vomerine teeth consisting of a double undulating row, as in the common river trout.

Lastly, as regards the true salmon, look into the mouth of a salmon smolt a few inches in length, and the dentition will be found such as I have just described it to be.

Thus, the dentition of the salmon, from the smolt to the adult, passes through a series of metamorphoses, representing the adult dentition of all the species of the Salmonidæ I have yet examined. The edentulatory process then, in the salmon, is not an accidental chapter in its history, but a philosophical reading of its affiliations with all the salmon kind.

II. The practical history of the dentition of the Forelle or Fario, the sea trout of British naturalists, is the same as in the salmon. As a smolt, it resembles in its dentition, with all other species of the Salmonidæ, the common trout. At a pound weight it still retains a double alternating undulating row of teeth on the body of the vomer, together with a distinct cluster on the fore part of the bone. At 3 or 4 lbs. weight the mesial row of the vomerine teeth from being double has become single; when larger or heavier, and presumed to be older,

these mesial teeth begin to fall out and are not replaced, the teeth on the chevron remaining to the last. In the sea trout, as in the salmon, the progress of edentulation is from behind forwards, and the process goes on until they are not unfrequently reduced to two or three, at which point, in respect of its dentition, the true salmon and the Fario are identical, or nearly so.

Thus the dentar formula of the French naturalist is again at fault. By it alone, the true salmon, from the smolt upwards to the fish of 2 lbs. weight could be distinguished neither from the common trout nor sea trout or forelle; and now we find, that by it alone, the full-grown forelle can scarcely, if at all, be distinguished from the true salmon.

III. Let us now apply the formula to the fish called the Salmo Trutta or common trout, lacustrine and riverine. In the young of all species the dentition is the same. The vomer carries the two kinds of teeth, the transverse and the longitudinal, perfectly distinct. The posterior are arranged in a double interrupted or undulating row, and extend well back on the body of the vomer; the group of teeth in front, already spoken of as the transverse teeth or those of the chevron, are well marked, and quite identical with the species of all the genera of the Salmonidæ. In certain large lacustrine trout I have examined, weighing from 6 to 12, and in one of 20 lbs, there was a double row of teeth on the body of the vomer, but the anterior group on the chevron had disappeared. Thus the law of edentulation in these lacustrine trout was the reverse of that subsisting in the true salmon and Fario, but I do not mean this to be applied to all the species of lacustrine trout, for I have not examined all; and the longer I live and the more extended my inquiries are, the more deeply am I convinced of the error of applying natural-history views derived from the examination of species and genera of one continent or of one country to those of another. Nature admits not of the restrictions laid down by naturalists; an European fact is not an African or Asiatic one,—still less is it kosmic.

As to the river trout I have examined, from a few ounces to 10 or 12 lbs. weight, I have found the law of their dentition to be a double row of teeth upon the body of the vomer, and, in addition, a group of transverse teeth on the fore part of the same bone, perfectly distinct. That there may be riverine species which lose the anterior group, and others which retain these but lose the posterior or mesial, I will neither affirm nor deny; I speak only of what I have seen. For reasons to be afterwards stated, I am inclined to think that this will be found to be the case.

IV. I shall now place before my readers, as briefly as I can, the result of multiplied researches into this subject. As a transcendental anatomist, I naturally commence with the dentition of the young; in its history we have the key to the numerous exceptions, rendering M. Valenciennes' law inapplicable, and to the anomalies and embarrassments of naturalists and others. If we commence the inquiry into the history of the dentition of the Salmonidæ at a stage of their growth when the size of the teeth admits of ready and sure inspection,—let us say in a fish from $2\frac{1}{2}$ to 4 inches in length, we shall find that whatever be the species examined, the dentition is the same. It consists of

Upper jaw.—Maxillary teeth	19 + 19	=	38
Intermaxillary do.	9 + 9	=	18
Palatal	15 + 16	=	31
Vomerine (anterior group or transverse mesial and posterior in a double row)			16
Lower jaw.—Mandibular	18 + 18	=	36
Tongue.—Lingual	5 + 5	=	10

Thus, as regards the dentition, the young of the Salmonidæ is of no species, but a generic animal, whose nearest approach as to type in the adult animal is the common river trout. It possesses all the teeth which any species of the natural family ever has, and more than any adult of any other species, and even in this respect is the perfect animal, *i. e. perfect generically.* By growth, which means merely the metamorphoses or transformations it has to undergo before acquiring its speciality, the generic young of the Salmonidæ simply loses certain teeth, which are not replaced; it does not acquire any new ones not already existing. As the changes are most remarkable in the system of the vomerine teeth, I shall confine my remarks to these.

1st. If the young fish is to grow up a river trout simply, it retains, as seems to me, in some species at least, all its vomerine teeth to its adult condition. I have examined large river trout of England, and such I have found to be the arrangement: the transverse or anterior cluster of vomerine teeth, which M. Valenciennes assumes to be absent in the adult of all trout, are quite as distinct and as large as those on the body of the vomer. Here is the dentition as regards the vomerine teeth of a Kennett trout (Hampshire) caught in the waters of Popham, weighing $9\frac{3}{4}$ lbs.; the anterior cluster of vomerine teeth are large and distinct; they are five in number; they are followed by a double row of teeth on the body of the vomer, also quite distinct;

these are ten or twelve in number. I have also examined a large Thames trout, weighing 5½ lbs.; it has a double row of teeth on the body of the vomer, and a group of perfectly distinct teeth on the chevron of the vomer. There is the skeleton of a very large river trout in the College of Surgeons, in London; the specimen is not favorably placed for the examination of this question, but so far as I can observe, the teeth are arranged as in the Kennett trout: thus, contrary to M. Valenciennes' view, these species of trout are not characterized by the absence of the anterior group, but, by the presence of a double row on the body of the vomer, which I have found to apply to all trout; all are characterized by a double row of teeth on the body of the vomer, but as regards the transverse or anterior teeth, some lose them and some do not; the river trout seem to retain them to the last, and M. Valenciennes admits that they are present in the beautiful trout of the Moselle, that species which he assumes as the type of his genus Salmo Trutta. Here is the description of the dentition of the trout of the Moselle by M. Valenciennes himself: "Il en existe un seul rang, sur chaque palatin et celles de vomer disposées sur deux rangs, sont divergentes aussi même plus fortes; aussi une petite rang transversale sur le chevron."* The trout of Baillon, which M. Valenciennes at first mistook for a salmon, until put right, as he admits, by the fishermen, has a double row of teeth on the body of the vomer, and a complete set of transverse teeth. Now this determination he arrived at from the examination of a young fish 13½ inches long; but with years, the trout of Baillon may lose some of these teeth and assume a different character; in as far, then, as regards the dentition of a Baillon trout of 13½ inches, the fish might be either a common river trout, a sea trout, or a salmon, for at that age the dentition is nearly identical in all; and thus the subfamily to which the Baillon trout belongs has not been determined by M. Valenciennes, and cannot be by his method in a fish of the size quoted.

On the other hand, in certain large lake trout, reported to me as from Ireland, the anterior cluster of vomerine teeth was absent or had disappeared, there remaining on the body of the vomer a double row of teeth: these trout were of great size: now this is the dentition which corresponds to M. Valenciennes' idea of a real trout, but we have seen that it does not apply to any river trout I have yet examined, nor to those of France, nor even rigorously to the celebrated

* Page 321, 8vo edition.

Leman trout, which has teeth on the chevron of the vomer. The adult lake trout I speak of were dark spotted trout with pink-coloured flesh. They all had a double row of teeth on the body of the vomer, whilst the anterior group, called transverse and teeth of the chevron by M. Valenciennes, had disappeared. That they were once present no one can now doubt; the law therefore of edentulation (for, in point of fact, it comes to this) in the lake trout of the species I now speak of, is to lose the anterior group of the vomerine teeth and to retain the double row on the body of the vomer to the last.

On the other hand, in a 4 lbs trout of Loch Leven, the largest of that peculiar species I have yet examined, the anterior clustered vomerine teeth were present, whilst those on the body were assuming the form of a single undulating row, which possibly in time they would have become.

Lastly, M. Valenciennes admits, that in the mouth of the trout of the Moselle, which he views as the type of the order, the clustered anterior teeth are distinct as well as the double row on the body of the vomer, thus excluding the species forming the type of the order from the law he intends shall apply to all.

Thus, the law of M. Valenciennes does not apply to the trout of British rivers nor to those of certain lakes, whilst it expresses the dentition of others. It is not then a safe guide for the determination of the subfamily, Salmo Trutta. Let us now test its accuracy in respect of the remaining subfamilies, the forelle or salmon trout and the true salmon.

If we trace the young of the forelle in its progress towards the adult fish, we shall find that up to a certain weight it retains its original generic dentition, that is, it resembles strictly that of all the salmon kind. At this stage of its growth or metamorphosis it could not be distinguished by the dentition alone from the Salmo Trutta or from the true salmon of the same size: yet neither the salesman, nor the naturalist, nor even the angler, lowest in the scale of observers, experiences any difficulty in deciding on the nature of the fish before him. They do not look at the teeth; they have other much surer characteristics, even at that age. Tracing the forelle until it attains a considerable size, we find at last that the body of the vomer presents a single row of teeth; but the same edentulation has happened to the salmon of the same size: in both, this single row is finally reduced to one or two teeth, and may in both ultimately disappear; even the clus-

tered teeth are ultimately reduced in the very large salmon and sea trout to two or three.

The law of edentulation, then, in the Salmonidæ is curious and interesting, the result seemingly of generic and specific influences. Certain of these difficulties are removed by tracing its history from the young, *i.e.* the generic fish, onwards. In it we find a type including all; it alone is perfect, the species being characterized by a loss of parts and not by any superadded organs. To this conclusion I had long ago arrived by other routes. What is true of the dentition we shall find to hold good in respect of some other characteristics of the generic animal, and to these, after a few additional remarks, I next proceed.

Up to the length of 13 or 14 inches, the dentition in all the subfamilies is nearly the same; at 2 lbs weight the dentition of the forelle and salmon is identical. They are both beginning to lose the teeth of the body of the vomer, and often show a single instead of a double row. At 6, 8, 10 or 20 lbs weight, both have lost the greater number of the teeth on the body of the vomer, but still retain those on the chevron. There may be certain species of the forelle or salmon trout which retain, to a large size, a single row of teeth on the body of the vomer, but I have not met with them.

Throughout the preceding observations I have confined my remarks, with but few exceptions, to species and subfamilies I have myself examined and can command; not that I distrust the observations of others, for what observations can, for example, be more fully depended on than the valuable contributions to Science of my most esteemed friend, Sir John Richardson. If a reference be made to his admirable work, the 'Fauna Boreali-Americana,' it will there be found, that the formula in use by M. Valenciennes, will not, cannot be applied with any success to the vast number of species of the Salmonidæ which people the seas and rivers of the great Continent of America. The Mackenzie River salmon, for example, must be rejected altogether from the natural family of the Salmonidæ, if the dentition alone be regarded, for it has the teeth *en velours*, or like the pile of velvet in narrow bands, and the upper maxillary bones carry none. The Salmo Rossii has thirty teeth on the tongue. Is Scouler's salmon (*Salmo Scouleri*) a salmon, a Fario, or a trout? The palatine and vomerine teeth are implanted in double rows, and there are none on the chevron of the vomer: here is a true salmon, for such I esteem it to be, with a dentition wholly peculiar. The great lake trout of North America has a cluster of

teeth on the anterior part of the vomer, and a double row behind, and herein is directly contrasted with the British lake species. In the common trout of New York there is a triangular cluster of about ten teeth on the anterior part of the vomer: no mention is made of any posterior rows. Such exceptions could be much multiplied; they are sufficient to prove that a dentar formula applicable to the adult Salmonidæ of all species has not yet been found.

Section II.

As it is by the exterior and not by the interior, that Nature chiefly specializes all animals, bestowing on them those outward forms, colouring and proportions, by which they are known to men and animals,—enabling man to distinguish at a glance the lion from the tiger, the zebra and ass from the horse and mule, the dog from the fox and wolf, which the interior, though examined by the profoundest anatomist that ever lived, scarcely enables him to do,—so I return to the exterior of the Salmonidæ to look for other proofs of the existence of the law I now seek to establish; the law by which I endeavour to give the genus or natural family a real existence; to reduce it to materiality; to include it within the range of legitimate science, and to submit it to intuitive or direct inspection; to prove, in fact, the young to be of no species, a generic being, invisible as such to the bulk of mankind, but real, tangible and visible to the scientific.

Coloration of the Salmonidæ.

The system of coloration of the Salmonidæ is either specific or generic. When the individual is in prime condition, perfectly developed, pure in breed, and adult, in as far as we can well determine, the coloration may then be considered specific, may be assumed as unalterable, in a certain sense, and characteristic. Viewed in this way, the coloration, 1st, of the true salmon may be briefly defined as silvery scaly, with a few dark or purple spots above the lateral line; 2nd, of the forelle, less silvery, with numerous dark spots above and below the lateral line; 3rd, of the lake trout, dark or purplish spots, more or less numerous, above and below the lateral line, and of the river trout, red spots more or less numerous above and below the lateral line. Lastly, certain river trout retain throughout life transverse bars composed of numerous minute dark spots; these I shall call parr-markings, as they are most distinct in the little fish

which in France is called *tacon*, in Scotland parr, in England fingerling, a fish of doubtful character, and whose real nature has not yet been clearly determined. I do not mean that these arrangements include all the species of the three subfamilies of the Salmonidæ; but the arrangement is of unobjectionable accuracy, in so far as it goes. There are many foreign species, no doubt, filling up all the gaps in each subfamily, but these have not been, as yet, sufficiently described.

Such is the specific coloration of the three great subfamilies generally. What is the generic coloration, that, namely, which includes all these? What is the coloration of the young, the generic type of the entire family? To describe it, we have only to examine the young of any of the species of any of the subfamilies, and we shall find that its coloration embraces all,—red spots, dark spots, of various hues, parr-markings, silvery scales. The generic animal then is perfect, and represents Nature's scheme; as it grows towards maturity it gradually lays aside its generic characters, retaining the special; if it is to become a river trout it retains the red spots, losing the others; one species, the parr trout, retains, with the red spots, the parr-markings; if a lake trout it loses the red spots, and retains the purplish and dark ones; if a sea trout or forelle it retains the dark spots only; if a salmon it loses all, saving a very few; the fewer it has, the more is it considered as of pure breed. A salmon showing five or six dark spots below the lateral line is looked on with suspicion by the salesmen, as if it had something of the forelle or trout about it; when puzzled, he turns the doubtful fish over and looks at it from several points of view; he is at that moment endeavouring to elicit a correct idea of its proportions, to which he appeals in the last instance. Scientific men would do well occasionally to observe the interested, for wherever self-interest is concerned the senses become exceedingly acute and the powers of observation infinitely refined. As nothing, I imagine, of the nature of gold could escape the eye of the experienced gold-seeker, so nothing that is eatable escapes the notice of the savage Bosjeman: poisonous serpents they distinguish from the innocuous at a glance, and from a drove of ten thousand oxen they will select and claim for their master, after a year's absence, a single animal of a team they once knew. The salesman, then, seldom errs in his discrimination of the fish submitted to his inspection: he knows nothing of Science, but trusts to his tact and instincts. It is the same with woman; she never bewilders herself with Science, but, trusting to

acute observation, she proves generally the best of practical naturalists. That the system of coloration in the Salmonidæ cannot always be depended on in characterizing the species may be admitted without under-rating its value. Human observation is not extremely refined; it is, in fact, extremely imperfect; besides, in the case of the Salmonidæ, the generic colouring is apt to reappear, though imperfectly, even in the adult: hence a fertile source, no doubt, of error. For my own part, I believe the system of coloration of the Salmonidæ to obey fixed laws, and to be constant and regular, the class being free from any influence which obviously affects the colour, namely, domesticity.

Section III.—*The Proportions of the Salmonidæ, as compared with each other and with the Generic Animal.*

The adult well-formed individual of every species of animal has its due proportions characteristic of its nature; with these its movements or style of motion is connected. By these movements it may be recognized by man and other animals when alive; when dead or at rest, its proportions indicate its nature. The distinction extends not unfrequently to sex, in which case the peculiar proportions are said to be sexual. In wild animals these proportions are remarkably constant, suffering indeed but little change or variety, as in the case of the coloration; it is amongst those animals whose nature permits of domestication that we find colour and proportions to undergo changes, which, though limited, are yet remarkable in extent.

Nearly all my early observations, made many years ago, were instituted on the adult specimen, or rather (for it is not so easy to determine what is adult) on individuals which had attained a considerable size. Salmon, sea trout and trout, of various species, were carefully measured and compared with each other, and the results compared, the object being to discover the law of subfamily and species. To these I now add the proportions of the generic animal, as compared with the adult, from which I think it will be manifest that the generic animal has proportions peculiar to itself, yet including the specific, that is, it presents a type out of which all the others may easily be constructed by the comparative enlargement of some measurements and the comparative restriction of others. The tables of these measurements I give at the conclusion of this section; the general results may be stated here.

Tabular view of the relative proportions—

1. Of the head;
2. Of the segment of the body anterior to the anal fin to the length;
3. Of the segment of the body beyond the anal fin to the length—

in the

Smolt.	*Estuary Trout.*	*Leven Trout.*	*Tweed Trout.*
1.	1.	1.	1.
¼ in. nearly.	⅓ in. nearly.	⅓ in.	¼ in.
2.	2.	2.	2.
·571.	·678.	·664.	·664.
3.	3.	3.	3.
15 to 35 or 2·33.	33 to 101 or 3·06.	34 to 100 or 2·94.	32 to 95 or 3·06.

The three great functions of respiration, locomotion and prehension, as represented by the jaws, teeth and fins, may be held, as compared with the general bulk of the body, to offer natural-history characters more or less indicative of the natural state of the individual, and of consequence of the species and subfamily to which it may belong: accordingly it appeared on measurement, that, in respect of the fins generally, the true salmon was much more delicately organised than the salmon trout, a coarser and no doubt a more rapacious fish, and that assuming the head (the gill covers and branchial orifices included) as a tolerably correct measure of the comparative strength of the gills and jaws, or, in other words, of the organs of respiration and prehension, the salmon trout, or forelle, uniformly exceeded the salmon in all such measurements. This law of proportions I found to hold good in all the species of the Salmo Trutta I have yet examined; the coarse fish presenting enlarged proportions of the organs I have just spoken of, as compared with the more delicate species; the common river trout, for example, of the brooks and rivers of Scotland, compared with the estuary trout, and more especially with the delicate char-trout of Loch Leven. The very young of the salmon kind, in its proportions, approaches more nearly the type of the common river trout than any other: as it grows these proportions alter, but even when of 4 or 5 inches in length its proportions are still peculiar, resembling more in their character the type of the river trout than that of the salmon, to which the specimen we know belongs. The measurements were made on the young of salmon from the Tay, the Shin and the Annan.

Thus the young animal, at a certain stage of its growth, is the type not of the species to which it belongs by hereditary descent, but

represents a generic type, transcendental, and requiring for its full development or embodiment in all its material, that is, specific forms, countless millions of years; for as the young, that is, the generic animal, includes many species, perhaps all which the natural family can assume in time and space, so as species die out, others appear, new to the world as species, but not generically. The *ossemens fossiles* belong to species clearly distinct from those that now live; their generic resemblance is undeniable. Species perish, but not genera, and thus the past, present and future, form but one. Species are not convertible into each other by any influences at present known to man: that these species follow each other, agreeably to certain laws, may be admitted, but that it is in the direction of a supposed perfectibility I do not believe, nor ever did. Time, which means plan and circumstances, which mean the geological changes on the earth, are, no doubt, the producing causes of species. Hence, the generic unity of every natural family, and the appearance from time to time of individuals, not resembling the species from which they spring, but others of the same natural family.

As regards the dentition, then, of the Salmonidæ, the young are of no species; on the contrary, they are transcendentally generic, that is, each individual, no matter how descended hereditarily, displays all the characters of all the species and subfamilies of that natural family to which it belongs: as it contains within it the possible of all the species, it seems reasonable to believe, that its development into any peculiar species must be dependent on physical causes at least, which must have a direct relation to the existing order of things. Should a species become extinct, another appears. This implies no new formation or creation, nor after all any real extinction, for the characters of the new species (new to man, who naturally looks only to the adult) and those of the extinct are still included in the young of every species which yet lives, or has lived. What has become extinct, may even reappear; but should the natural family perish all the species cease with it.

Domesticity plays a limited part in the production of varied forms, but these forms do not constitute species: some species are more influenced by domesticity than others; man very little, if at all. It is the same as regards the laws of coloration and proportions: the generic animal includes the types of all.

I have sometimes thought that this law of natural family and of propagation of a generic animal not at first specific may play a part in some phenomena at present inexplicable. For example: all that

is as yet known respecting the river fish called parr was known to Willoughby; even the extraordinary fact that in the female parr the ovaria remain stationary, whilst in the males the milts at certain times become excessively developed. This antagonism in the character of the young has no counterpart, in so far as I know, in natural history. But a still more extraordinary fact, though not so well determined as the preceding, was also known to Willoughby. With this milt of the male parr the ova of a salmon 40 lbs. in weight may be fecundated, whilst the parr itself does not weigh more than 3 or 4 ounces. Now, there is nothing like this in natural history, and the fact stands alone in singularity. Reflecting on these curious facts in the history of the parr, and on others connected with its natural history, I have sometimes fancied that as the parr is a generic animal apparently, upon whose specific form naturalists are not yet agreed, may it not be, that being the product of a generic animal which has not attained a specific form, it may never attain that condition, but remain in this aborted state, a type merely of the salmon kind. In the case of the parr, if this idea be correct, the female remains barren, the male becomes productive: possibly in the great range of the zoological world there may be instances of the contrary, though unknown to me; or it may happen, as a law of nature, that the generic animal of both sexes may grow up unaltered and be productive, the specific forms not appearing in the existing order of things. These are but speculations it is true, but they are speculations supported by laws which hitherto have been, and still are, but imperfectly understood.

I here subjoin a single remark, lest it be supposed that I believe in the reality of species.

Species are only real in so far as regards man's observing powers: they seem to form no part of Natures scheme or plan, which obviously fills up all gaps, leaving no link deficient in the great chain. A serial unity connects all, the past, the present, and the future. Those who fancy that gaps exist mistake merely a deficiency in their own knowledge for a part of Nature's scheme. The transmutation of one species into another I do not believe in, any more than in the three or four successive creations of Cuvier. Unless we are prepared to adopt the doctrine of chance, there can exist only one creative idea, and consequently one creation. The theological doctrine of Socrates, worked into a system by Philo-Judæus and his followers of "the final cause" school, applies merely to simple mechanical laws of obvious signification and application: it has nothing to do with the great laws of life; the laws of formation and deformation; the laws of

unity of the organisation in all that ever lived; the law of serial unity which makes the living and past organic worlds one, and not many.

Nevertheless, to man, species is everything in a practical sense; for, although specific character and structure explain but little in the philosophy of zoology, specialities are the first steps which lead to more important inquiries: without this step philosophic zoology, geology, palæontology, could not be said to exist: hence the intrinsic and enduring value of the labours of the immortal Cuvier.

R. Knox.

Meissen House, Upper Clapton,
June, 1855.

On the Growth of the Salmon, from the Egg to the Adult.
By R. Knox, M.D., F.R.S.E., &c.

All who have angled in such rivers as the Tweed, frequented by salmon, sea trout and river trout, must soon, if they observe at all, have become acquainted with the following facts or appearances:—

1. That river or common trout, whether large or small, may be readily enough distinguished from every other kind of fish caught in the river; occasionally, though rarely, the young trout may be confounded, when about the length of the little finger, with a small fish called the parr, to whose history I shall presently advert, but, in the fresh specimen, and with a good sight, the young trout may always be distinguished from the parr.

2. That these small fish, called parr, are to be found in the rivers frequented by salmon or salmon trout, from the sources to their embouchures, and in such rivers only. But the converse of this is doubted; first, by Mr. Young, of Invershin, who says that there are rivers frequented by parr, into which neither salmon nor salmon trout have ever penetrated; secondly, although I fished the Tyne, in Scotland, a great many times, and had it fished for me by skilful anglers, who knew the river well, I never could find a parr; thirdly, I was present at the fishing of a stream on the East coast of England (North Riding of Yorkshire), on the estate of Mr. Wharton, near Guisborough: the stream was fished with a net (which took everything), from a mill-dam insurmountable for salmon to the sea, yet no parrs were found: nothing, indeed, was taken but—1st, sea-trout of various sizes; 2nd, smolts covered with scales, on their way to the sea; and 3rdly,

a few common trout: on every hypothesis, save one, the absence of the parr in these and the adjoining streams is inexplicable: the fishing took place in May; the sea trout and smolts were descending to the sea: the net took everything to the minnow, yet no parrs were to be found: on one hypothesis alone is this explicable, namely, that the young of the sea trout, hatched from the ova deposited in November of the preceding year, had all become smolts, and were proceeding to the sea. If the age of these smolts had been two years or even one year, the young fish, in their generic or parr dress, must have been found in the streams and pools: nothing of the sort occurred: had the smolts, then and there found, being the females of one year, the males of the same age, but less in size, not as yet changed into smolts, must have been discovered in the net: in a fishing of some miles nothing of the kind appeared.

3. That these fish, called parr, are male and female; that in the female the roe remains always at its minimum; in the male, on the contrary, the milt enlarges remarkably during the autumn and winter months, and not infrequently is found enlarged at all times of the year.

4. That, in addition to river trout of various sizes, and of parr, which never exceed eight or nine inches in length, there appear suddenly as it were, in the streams, in May, thousands of a small fish (the smolt) covered with silvery scales, which fish is presumed to be, and has been proved to be, the young of the salmon and sea trout. It was first remarked by Mr. Hutchinson, of Carlisle, in 1782, and subsequently by all who observed what happened to the smolt when kept for some time and roughly handled, that the scales being rubbed off, the smolt assumes the appearance of a parr; but Mr. Hutchinson did not think that this proved the smolt and parr identical. What is the age of these fish—of the May smolts? The whole question of the protection of the salmon is wrapped up in this question. The question of its identity with the parr is a distinct question; the presence of the parr-markings to be discovered under the scales proves nothing specifically, since these are generic characters common to the whole natural family of the Salmonidæ at a certain period of their growth or development to trout and salmon of every kind.

5. It was asserted by Willoughby (1686), and the assertion has not been refuted, that with the developed milt of a male parr, 6 or 7 inches in length, the ova of a full-grown salmon may be fecundated. If we adopt the theory, that under every circumstance the parr is simply a young salmon or salmon trout, as the case may be, the astounding physiological fact first announced by Willoughby still

remains unexplained, and without a counterpart in zoology, namely, that the male salmon of five or six months age, according to the Invershin hypothesis, and of seventeen or eighteen months age, agreeable to the Drumlanrig experimenter, should already have arrived at the adult condition in respect of the ability of reproducing his kind; the female in the meantime continuing, as regards the ovaria, at the minimum of development; and, as if to add to the complexity of the enigma, we are now further asked by these experimenters to believe, that the female, in whom the ovaria do not alter, grows faster than the male by a whole year, the generative organs and the general growth of the body being in an inverse ratio to each other.

6. The May smolts, covered with scales, collect into flocks or groups, and descend the rivers to the ocean; parrs never do. In the smolt which descends to the ocean in May to seek a habitat still unknown, the ovaria and milt are uniformly at their minimum. His food in the ocean was unknown until I demonstrated it to be the eggs of the Echinodermata. The smolt which descends to the ocean in May, 5 or 6 ounces in weight, returns in July, August and September a grilse or salmon of as many pounds. If permitted, he returns to the ocean next spring; he again makes for the rivers a grown salmon in the autumn of the same year, varying from 12 to 20 lbs. weight. His subsequent history is not well known.

Lastly: Whilst in the fresh waters the grown salmon does not feed, but loses condition to a great extent: thus a return to the ocean is essential to his existence. Whilst a smolt he lived and throve on the common food of trout; he acquires the silvery scales in May, being then 7 or 8 inches in length; he seeks the ocean, impelled by an instinct seemingly as strong as that which induces the grown salmon to rush up the rivers at the approach of winter.

The observations just made are generally admitted to be facts: the more curious, indeed all of any moment, were known to Willoughby, Hutchinson and others; but they do not solve the difficulties connected with the subject, the first of which is—What is the age of the May smolt?

What is the age of the May Smolt?

The opinion which has prevailed, in Annandale, time out of mind, is, that as the parr is the young of the salmon, so the May smolt must be one or two years old; some thought more. The practical fishermen of the Tweed thought otherwise; they disbelieved the parr to be the young of the salmon, and thought that the May smolt was the

product of ova deposited under the gravel in October, November and December of the previous year. To bring the question of age to an issue there are obviously two ways: the first is to observe the progress of the ova surrounded by the natural influences, and undisturbed; the second is to watch the development of the ova placed in artificial circumstances. I naturally adopted the first, and for this simple reason, that the salmon being an animal *feræ naturæ*, or of the *wilde;* it would, at all times, be difficult to say how far an artificial locality might affect it. The result of my early observations have been stated briefly, and in much clearer terms by Sir John Richardson, in his admirable 'Fauna Boreali-Americana,' than by myself. I shall here quote from his work, premising that I had already carefully observed the development of the ova of the salmon deposited in the bed of the Whitadder, on the 2nd November, 1832; that on the 25th February I found the ova under the gravel seemingly unchanged; that on the 23rd March changes were visible, some of the young fry having burst their coverings, and were lying embedded in the gravel. On the 1st of April most of the fry had quitted their gravelly bed, and on the 19th May the river abounded with smolts (some 7 or 8 inches in length) of various sizes, all covered with scales. We now learned that smolts had been taken on the 5th May in the same streams, which I considered as the young of an earlier hatching, and as on a subsequent occasion I found ova unchanged on the 10th April, and on the 17th April fry lying embedded in the gravel, I inferred that the time of hatching varied according to circumstances easily understood. Twenty-two smolts were taken from the river, and examined with the greatest care; they were male and female, in tolerably equal numbers; the male could often be recognised from the female by the enlargement of the extremity of the lower jaw. It is right to observe, that for two or three years the parr had disappeared from the Whitadder. To return to the remarks made on this subject by Sir John Richardson, extracted from his admirable work on the American Fauna:—

"Dr. Knox, in the appendix to the very able paper from which the foregoing passages are abridged, remarks, that there are two circumstances which persons* of sound judgment and great experience with regard to the salmon question still think undecided, or at least demanding a more extended proof. The first is a series of experiments to determine the growth of the salmon fry from the state of the egg to its attaining the length of 6, 7, 8 or 9 inches, before which it is

* I alluded to Mr. R. Buist, of Perth.

seldom seen by the angler, and after which it ceases to be found in fresh-water rivers. Secondly, proof that the fish we call salmon fry (smolts), taken in salmon rivers by anglers during the months of April and May, do really proceed to the ocean, and return after a period to the rivers as grilse, salmon trout, and salmon. The facts ascertained by Dr. Knox, in conjunction with the previous observations of others who have attended to the subject, go towards the answer of the first question, whilst the experiments made in Sutherlandshire, on the Laxford and Divard may be considered as a reply to the second. Fry marked in April returned as grilse on the 25th June."

Soon after these observations had been made and submitted to the Royal Society of Edinburgh, others entered on the field, and the Duke of Buccleugh must have taken some interest in the matter, since he permitted one of his game-keepers, a Mr. Shaw, to experiment on the ova of the salmon, and on what he called the parr. The ideas of this person respecting the parr have no foundation whatever either in observation or experiment; the experiments he made led to what is called the two-years' theory of the May smolt. By confining the young of the salmon in ponds and boxes, and placing them under artificial circumstances, he contrived to retard the growth of the fry to the extent specified: thus he first misled himself, and then others.

When I first heard of the two years' theory of the age of the May smolt, my remark was this—"Wait a little, and another experimenter, proceeding on the same principles or want of principle, will prove to you that three years is the age; and after a little while another of the same class will show you that one year is the true period." The prediction was verified to the letter. Mr. Hannay, of Kircudbright,* showed by experiment that the smolt is a three years' old fish; Mr. Young, of Invershin, by the same method, proves one year to be the true age, and the experiment repeated at this moment by my esteemed friend Dr. Esdaile, of Perth, on ova reared in ponds adjoining the Tay, has brought to a sudden close, and for ever, the two-year' old theory, a delusion of the plainest character, but yet sufficient to mislead many naturalists. Scientific continental naturalists, finding persons engaging in these controversies who are not scientific men in any sense of the term, stand aloof.

Whilst I now write my friend Dr. Esdaile, to whom the public is already deeply indebted for services rendered humanity in India, and who I am proud to say was at one time my student, informs

* See this gentleman's letter, published by me in the work already quoted; the original is now before me.

me by letter, that a new theory of the age of the May smolt has been proposed, intended to include the history of the parr and all its difficulties: it is this; "the silvery May smolt fully developed as a smolt, and actually proceeding with or without the kelts, or spawned fish of last autumn, is a female of one year's growth; the males are there still in the form of parrs; their growth is slower; they remain in the waters another year, forming the autumn and winter parr, and descending next May with their sisters of one year's growth." I do not recollect a single observation directly in favour of this view, which still leaves all that is extraordinary in the history of the parr unexplained. The smolts which descend the rivers in May are of all sizes, from 3 inches or less to 7, 8 and 9 inches; the males supposed to be left are at least as large. These smolts are of both sexes, and such will be found to be the case with those leaving the ponds on the Tay. But if this be true, (which I doubt not), what becomes of the theory? The following are a few of the direct observations bearing on this question which I find in a little work I published lately,* but many more could be added to this had I leisure to examine my journals.

At my request, Mr. Harkness, of Lochmaben, fished the Æ, an Annandale river, for me in December, and caught with a bait (small red worms) twenty-four parr, which he transmitted to me at the time in Edinburgh. Of these parr fourteen were female and ten male. The largest parr measured 7 inches, the smallest 3 inches; the average was $5\frac{1}{2}$ inches. The female parr were as large as the May smolts. Why had they not left in the preceding May? In the females the ovaria were as usual at their minimum: in some of the males the milts were of considerable size, in others not developed: they had been feeding on insects. Now, if these parr were young salmon, why the development of the milt in the male? And if the females belonged to the class which was to descend next May, and the males only after another year, how comes it that no well-marked distinction can be established in respect of size? Of the hundreds of May smolts I have examined, I have never found the roe or milts altered in the slightest degree; they were uniformly at their minimum, nor could I ever discover any traces indicative of a fact which ought to have occurred if the winter male parr, with the milt developed, grew into a salmon, namely, appearances indicating that the milt had been developed the preceding winter.

* 'Fish and Fishings in the Lone Glens of Scotland. Routledge, London.'

On the 22nd July, 1833, six parr were caught with the artificial fly at Romaro bridge on the Lyne, a branch of the Tweed. They were of the usual size, averaging probably 5 inches: all were males, with the milts large, and $2\frac{1}{4}$ inches in length. Do we usually find salmon with the milts large in July? And if these parr become smolts next May, what in the meantime becomes of the enormously enlarged milts?

On the 3rd September, of thirteen parr caught in the Tweed, between the Bield and Polmudie, there were only two females, and such observations, if repeated and supported by extensive evidence, might lead to important results. In the mean time, it is remarked in my journal, that of these eleven males some were $8\frac{1}{2}$ inches in length, others only 4 or 5 inches; in the larger the milts were enormously enlarged. Now, what became of these males, which in September were as large as the largest May smolts? Did they cease to grow until the arrival of May? What became of the milts? And if such a premature development of the male takes place without a cause and without an object, how comes it that no May smolt ever shows traces of these organs having been once developed?

In conclusion, it is to be regretted that experiments which might have formed valuable acquisitions to science have been so conducted as to be repudiated by most scientific men. Profoundly ignorant of the basis of all zoological science, the observers could not be trusted. Those being now conducted near Perth are in quite different hands, and will, no doubt, lead to important results. The question of a disproportion of males to females, as regards the autumn and winter parr, did not escape my notice, as may be seen by reference to page 93 of the work so often referred to in this brief notice; at page 95 will be found a minute account of the experiments on the Dee, proving the three-year old theory. With a little more confinement and restraint, the period of development of the smolt might perhaps have been extended to four years;* the two and three-year theories have now been disposed of by my friend Dr. Esdaile, but the one year view has still to be proved, and this can never be satisfactorily done by breeding in artificial waters.

R. Knox.

Miessen House, Upper Clapton,
June, 1855.

* Mr. Newman, editor of the 'Zoologist,' and a distinguished naturalist, informs me that you may keep tadpoles as tadpoles as long as you like, merely by restraining their development.

Proceedings of Societies.

Entomological Society.

July 2, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. vii., No. 13; by the Society. 'The Literary Gazette' for June; by the Editor. 'The Journal of the Society of Arts' for June; by the Society. 'The Zoologist' for July; by the Editor. 'Revue et Magasin de Zoologie,' 1855, No. 5; by the Editor, M. Guèrin Méneville. 'Monograph on the British Species of Phalangidæ or Harvest-men'; by R. H. Meade, F.R.C.S.; by the Author. 'Saussure's Monographie des Guêpes Sociales', Cahir, No. 7; by the Author. A specimen of the mole cricket (*Gryllotalpa vulgaris*); by Mr. J. P. Edwards, of Lyndhurst, Hants.

Election of Members.

John Walter Lea, Esq., of Ramsgate, and Alexander Fry, Esq., of Montague Square, were balloted for, and elected members of the Society.

Exhibitions.

Mr. Meade returned and exhibited the collection of British Arachnida, preserved in glass tubes, formerly presented by him to the Society, and which had recently been forwarded to him for the purpose of replenishing the spirit in the tubes: he had also considerably increased the number of species in the collection, which now numbers ninety-four true spiders and thirteen Phalangidæ. Mr. Meade stated that he now employed as a substitute for spirit, a saline solution composed of equal weights of water and sulphate of magnesia, with the addition of a small quantity of alcohol and sulphuric acid; this does not injure the colours of spiders, as spirit almost invariably does.

Mr. Foxcroft sent for exhibition a small box of Lepidoptera, recently taken in Perthshire; it also contained the silken galleries formed in ants' nests by the larvæ of Tinea ochraceella, *Teng.*

Mr. Stevens exhibited a splendid new longicorn beetle from Tana, New Hebrides, for which Mr. Adam White proposed the name of Psalidocoptus scaber.

Mr. Westwood read a note from a correspondent, who had found the larvæ of Melöe in immense numbers on potato-plants "hanging in clusters like swarms of minute bees;" he also exhibited some of the larvæ which had been forwarded to him.

Mr. Janson exhibited two specimens, one of which he presented to the Society's cabinet, of Hypulus quercinus, *Payk.*, taken by him on the same stump of oak which yielded the species last year at Colney Hatch.

Mr. Smith announced that Mr. Frederick Grant had recently discovered colonies of Tapinoma erratica at Wimbledon and Weybridge; he also exhibited the female of

this species from the latter place, being the only British specimen of that sex hitherto captured.

Mr. Edward Sheppard exhibited three specimens of Drypta emarginata, found by Mr. Arthur Adams under a tuft of grass near Portsmouth, but about two miles inland.

Mr. Stainton exhibited a number of very accurate drawings of the transformations of Micro-Lepidoptera, made by Herr Grabow, of Berlin, among which the most interesting was that of Asychna æratella, which feeds in a pod-like excrescence which it appears to form on the shoots of Polygonum aviculare, in autumn.

Mr. Hunter exhibited a female Stauropus Fagi, recently taken at Black Park, and also the young larvæ about thirty-six hours old, produced from eggs laid by this specimen.

Anommatus and Langelandia.

The President stated, with reference to the communication made by him at the last Meeting from Mons. Charles Delarouzée, that he had recently been informed by that gentleman that the water-butt alluded to was sunk in the earth to the depth of three feet, which would account for his having found the insects then mentioned three feet below the surface; he added, that he had no doubt, by searching in similar situations in this country, we might discover both Anommatus and Langelandia.

Observations on the Habits of two species of Mygale.

Under the above title, Mr. Smith read the following notes, by Mr. H. W. Bates:—

"With regard to spiders, there is one observation I made, which I am sure will be of the highest interest to Science: it is with respect to the habit of the genus Mygale to prey on birds. Now, I have detected them in this fact as far back as 1849, but thought little of it at the time, as I had the idea that it was a well-known and undisputed fact in Science. Lately, however, I read an account (I think, in 'Langsdorff's Expedition in the Interior of Brazil'), where the fact is considered to rest on no foundation, and to be one more of the fables originated by Madame Merian.

"Now, I will relate to you what I saw in the month of June, 1849, in the neighbourhood of Cametá; I was attracted by a curious movement of the large gray-brown Mygale on the trunk of a vast tree: it was close beneath a deep crevice or chink in the tree, across which this species weaves a dense web, open for its exit and entrance at one end. In the present instance the lower part of the web was broken, and two pretty small finches were entangled in its folds; the finch was about the size of the common siskin of Europe, and I judged the two to be male and female; one of them was quite dead, but secured in the broken web; the other was under the body of the spider, not quite dead, and was covered in parts with the filthy liquor or saliva exuded by the monster. I was on my return from a day's excursion by land at the time, with my boxes full of valuable and delicate insects and six miles from my house, and therefore could not have brought the specimens home, even if I had wished, which I did not, as the spider was a very common species, easily to be procured nearer home. The species I cannot name; I sent several fine specimens, stuffed, to London, in 1851; it is wholly of a gray-brown colour and clothed with coarse pile. Doubtless, you will immediately know the exact species to which I refer.

"If the Mygales did not prey upon vertebrated animals I do not see how they could find sufficient subsistence.

"On the extensive sandy campos of Santarem, so bare in vegetation, there are hundreds of the broad slanting burrows of the large stout species (that fine one, dark brown, with paler brown lines down the legs, of which I sent specimens in 1851). The campos, I know, from close research, to be almost destitute of insects, but at the same time swarm with small lizards, and some curious ground finches of the Emberiza group (one of which has a song wonderfully resembling our yellow bunting of England), besides which, vast numbers of the Caprimulgidæ and ground doves lay their eggs on the bare ground. I believe this species of Mygale feeds on these animals and their eggs at night. Just at the close of day when I have been hurrying home, not liking to be benighted on the pathless waste, I have surprised these monsters, who retreated within the mouths of their burrows on my approach."

Some conversation ensued on the supposed poisonous nature of spiders, and the strength of the webs formed by various species, in which the President, Mr. Westwood, Mr. Meade, Captain Cox, &c., took part.

Note on Otiorhynchus sulcatus.

Under this title Mr. Newman read the following paper:—

"In the later months of summer this weevil may frequently be seen crawling about the wood-work of the fern-house, especially at night; and who does not visit his fernery by night? But occasionally you may also find the female clinging to the stipes or frond-stalks, especially of Adiantum, Cystopteris and Asplenium, genera which send up fronds in succession until the stalks look like a little forest: nestled among these, and with its head upwards, it drops its small white globular eggs, which fall quite free, and seem neither to attach themselves by any viscid covering nor to be attached designedly by the parent to the frond-stalks or other substances which may happen to be at hand. We must allow imagination to picture the hatching of the egg and the descent of the tiny grub: I find the juvenile depredators a few days afterwards ensconced in snug little cavities of the caudex scarcely large enough to admit the head of the smallest pin: they are now minute, jelly-like, transparent legless maggots; I say jelly-like, because the word describes their appearance with great exactness; but it must not be understood as implying the possession of the moist or mucous surface distinctive of the larvæ of some Coleopterous and Hymenopterous insects: on the contrary, the surface of these little grubs might be described in the words of pleasant old Gerarde, as clean and 'dry in the first degree:' after feeding for a very few days the colour of the grub becomes opaline and slightly opaque, the opaline tint being caused by the quantity of food in the intestines; this food becomes more and more apparent, as long as the grub continues to feed. The cavities in the caudex of the fern now rapidly become larger, and the effect is very visible above ground. When the grub is feeding most eagerly it is spring; and, one after another, the Ionic volutes of the nascent circinate fronds droop, wither and fall, plainly proclaiming the presence of the sapper and miner at work below, the canker-worm at the seat of life. When its appetite is at length satiated, the grub becomes quite opaque, and of a uniform cream-colour; the food disappears from the intestinal canal, and the creature withdraws about three-quarters of an inch from the scene of his labours. We use a light sandy soil for the ferns, and the grub seems to find no difficulty in making his way through

this, and adapting it to his purposes; for he now forms a circular cell, quite large enough for himself and two friends, although he never invites them; and he polishes up the walls of this cell in the nicest and neatest manner; and, without using silk of his own spinning, or any other material except the often-watered earth, he makes every thing snug and comfortable, and settles himself in for a fortnight's rest, during which he practises total abstinence, as if to atone for his former voracity. I will describe the grub in this state of abstinence and rest. Length, ·4125 inch; greatest breadth, *i.e.* at one-third of the length between the head and the anal extremity, ·151 inch: head testaceous, horny, very shining, gibbous in front, rounded at top, truncate below at its greatest diameter, having therefore the figure of a beehive: beneath the truncature protrudes the labrum, which exhibits the anomalous or previously unobserved character of a curious pectinated process at each angle,—two strong, incurved, testaceous mandibles, having a blunt tooth near their black tip, or, perhaps, more correctly characterised as being obtusely bifid at the apex,—two maxillæ, much smaller and less conspicuous than the mandibles, but horny and glabrous; internally and apically the maxillæ bear an obtuse lacinia, having a serrated, subspinous, internal margin; externally they bear a biarticulate palpus, the basal joint of which is stout and nearly globose, the apical joint rather longer, cylindrical, and somewhat obtuse,—finally, a labium, long and narrow, bearing at each external angle a biarticulate palpus, much resembling those of the maxillæ. The body is composed of twelve segments, of which the first seems to have only its sternal surface developed, and the twelfth is little more than a tubercle; on the second on each side near the head is a circular spiracle, the only one that I can find: there are no legs, but each segment has a series of papillæ and a number of strong testaceous bristles; aided by which, the grub has very considerable powers of locomotion when placed on a somewhat uneven surface. At the expiration of a fortnight the larval state has ceased and that of pupa has been assumed; this undergoes changes of colour very much like those of the larva; at first it is hyaline, then slightly opaline, and finally cream-coloured, with very conspicuous black eyes: the peculiarities of a necromorphous pupa are now so familiar to entomologists that I need not dwell on them; every limb is free, and every joint of the antennæ and tarsi is discernible through the slender pellicle with which it is invested; the elytra, attached to the dorsal surface at the anterior margin of the mesonotum, at first bend forwards, and passing between the middle and hind legs, repose on the latter, which, in their turn, are neatly arranged in front, reposing on the sternum. An unexplained phenomenon must be noticed here; a considerable number of the pupæ, say one in nine, present an atrophied or shrunken appearance, and these, not possessing sufficient vitality to carry them through the final change, die, turn black, and eventually decay: coexistent with these atrophied pupæ is the presence of a certain myriapod, which I believe to be the young of Lithobius forcipatus; but the connexion between the myriapod and the weevil still remains to be unravelled. The pupa state, like that of the larva after it leaves off eating, lasts about a fortnight, and it takes another fortnight at least for the weevil to become hard and fitted for a more locomotive life; so that six weeks are occupied from the formation of the tomb-like earthy cell to the time for finally quitting it. The beetle, when first emancipated, is of a dull white colour; it soon turns to a pale, testaceous brown, which gradually becomes darker and darker, until the final deep hue and hardened surface are attained: it then breaks the walls of its self-constructed prison and crawls solemnly and slowly about the greenhouse, probably in quest of amorous adventures, to be followed by those

parental duties, which are a necessary consequence of that command which went forth at the beginning to weevils as well as to man, 'Increase and multiply.' It is more than twenty years since I first traced the history of this insect, which is a most dangerous enemy to the horticulturist: my observations were then directed to its operations on Saxifraga sarmentosa, the crown of leaves and flowering stalks of which I constantly found completely severed from the roots by this subterranean marauder, but I think this is the first time it has been noticed in connexion with ferns."

Insects injurious to Forest-trees.

Captain Cox remarked that Chrysoclista Linneella was swarming on the trunks of lime-trees in Hyde Park, the bark of the trees in many places being almost destroyed by the larvæ: he also alluded to the destruction now progressing of many fine elms and other trees in the parks by the Scolytus, &c., and regretted that those in authority would not adopt the very simple means to remedy the evil.—*E. S.*

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. A. R. Wallace.*—"St. Munjon Coal Works, Borneo, 8th April, 1855. You will see by the heading of this letter that I have changed my locality. I am now up the river Sadong, about twenty miles N.E. of Sarawak. A small coal-field has been discovered here, and is now being worked. At present the jungle is being cleared, and a road made to carry the coals to the river side, and it is on account of the scarcity of roads in this country that I thought it advisable to come here. Another reason was, that this is the district of the "Mias" or Orang-utan, the natural history of which I am very anxious to investigate, so as to determine definitely whether or no three species exist here, and also to learn something of their habits in a state of Nature. An English mining engineer has the direction of the works here, and has about a hundred Chinese labourers engaged. I am residing with him, at the foot of the hill in which the coal is found. The country all round us is dead level and a perfect swamp, the soil being a vegetable mud, quite soft, and two or three feet deep, or perhaps much more. In such a jungle it is impossible to walk; a temporary path has, however, been made from the river (about a mile and a half) by laying down trunks of trees longitudinally. Along this path is very good collecting-ground, but many fine insects are daily lost, and butterflies can hardly be captured at all, from the impossibility of stepping out of the path, and the necessity of caution in one's movements

* Communicated by Mr. S. Stevens.

to preserve balance and prevent slipping, not at all compatible with the capture of active tropical insects. The small clearing in which our houses are situated also furnishes me with many good insects among the trunks and stumps, and other decaying timber. Half a mile further on in the jungle, on the hill side, is another clearing, where coal levels are to be opened; and, lastly, the jungle is being cut down to form a road or railway, and which, as it progresses, I expect will offer me very fine collecting-grounds. Having now been here nearly a month I can offer some opinion on its entomological capabilities. Imagine my delight in again meeting with many of my Singapore friends, — beautiful longicorns of the genera Astathes, Glenea and Clytus, the elegant Anthribidæ, the pretty little Pericallus and Colliuris, and many other interesting insects. But my pleasure was increased as I daily got numbers of species, and many genera which I had not met with before. Longicorns I think are more abundant than at Singapore, and more than half of them are new to me. The species, too, run a size larger. Some of the scarcest there are here the most abundant, while many of the commonest of that locality seem to be altogether absent from this. Curculionidæ are about equal in number, and there is a fair proportion of novelty. Two or three species closely allied to the Mecocerus Gazella are abundant, and many curious Brenthidæ. I am paying much attention to the most minute species, and can safely promise abundance of novelty for Mr. Waterhouse. Carabidæ are hardly so abundant as at Singapore, but I have some beautiful new Therates, Catascopus and Colliuris, and the curious Thyreoptera also occurs sparingly under Boleti. The Cleridæ seem very similar to those of Singapore, but scarcely so numerous. The Buprestidæ I am happy to say are very fine; not that the species run very large, but they are tolerably abundant. One of the most beautiful I make out to be Belionota sumptuosa, about an inch long, and of the richest golden copper-colour; it flies with the greatest rapidity, making a loud bee-like hum, and settles on timber only in the hottest sunshine. There are also many smaller species of a dark green, variously marked with lighter green or golden spots (Chrysobothris sp. ?). Also several slower flying kinds, which when fresh are clothed with a yellow powder, like the Euchroma gigantea? of Brazil, which, however, seldom reaches England in that condition, as it is difficult to capture and kill the insect without injuring its delicate covering. I have also some very curious minute species, making altogether thirty-six species of this interesting family collected in Borneo. I also pay much attention to

the Elateridæ, and have many pretty things, especially among the velvety species, with a swollen thorax. Of Heteromera, Erotylidæ, Chrysomelidæ and Trimera, I have hosts of curious things, which are daily increasing in number. The only family in which there is an absolute deficiency, is that of the beautiful Cetoniadæ. I have only at present one or two Tænioderas, a fine green and black Coryphocera, and the handsome Macronota Diardi, which is, I believe, very rare: I scarcely dare hope to increase my collection of this family to any great extent, as they evidently are only abundant in mountainous and rather open shrub-producing districts, while they are scarcely at all represented in the dense and gloomy jungles which are the favourite haunts of all those insects which at any period of their existence feed on fresh or decaying timber, or on the boleti which grow upon it. Among my latest captures are, my first species of Paussus, which I have been long anxiously looking for: I took it in the daytime flying about fallen timber. Two days since I obtained a species of Malacomacrus, a Brazilian genus of Longicorns, described and figured by White in the 'British Museum Catalogue,' and yesterday, while at breakfast, a magnificent black and yellow spotted Lamia flew into the verandah, and was caught in my hand. I have now 135 species of Bornean Longicorns, and I do not despair of getting 200 before I leave this place, which I mean to work thoroughly.

To give English entomologists some idea of the collecting here, I will give a sketch of one good day's work. Till breakfast I am occupied ticketing and noting the captures of the previous day, examining boxes for ants, putting out drying-boxes and setting the insects of any caught by lamp-light. About 10 o'clock I am ready to start. My equipment is, a rug-net, large collecting-box hung by a strap over my shoulder, a pair of pliers for Hymenoptera, two bottles with spirits, one large and wide-mouthed for average Coleoptera, &c., the other very small for minute and active insects, which are often lost by attempting to drop them into a large mouthed bottle. These bottles are carried in pockets in my hunting-shirt, and are attached by strings round my neck; the corks are each secured to the bottle by a short string. The morning is fine, and thus equipped I first walk to some dead trees close to the house frequented by Buprestidæ. As I approach I see the bright golden back of one, as he moves in sideway jerks alonk a prostrate trunk,—I approach with caution, but before I can reach him, whizz! — he is off, and flies humming round my head. After one or two circuits he settles again in a place rendered impassable by sticks and bushes, and when he leaves it, it is

to fly off to some remote spot in the jungle. I then walk off into the swamp along the path of logs and tree-trunks, picking my way cautiously, now glancing right and left on the foliage, and then surveying carefully the surface of the smooth round log I am walking on. The first insect I catch is a pretty little long-necked Apoderus sitting partly upon a leaf: a few paces further, I come to a place where some Curculionidæ, of the genus Mecopus, are always seated on a dry sunshiny log. A sweep of my net captures one or two, and I go on, as I have already enough specimens of them. The beautiful Papilios, Evemon and Agamemnon, fly by me, but the footing is too uncertain to capture them, and at the same moment a small beetle flies across and settles on a leaf near me—I move cautiously but quickly on—see it is a pretty Glenea, and by a sharp stroke of the net capture it, for they are so active that the slightest hesitation is sure to lose the specimen. I now come to a bridge of logs across a little stream; this is another favourite station of the Buprestidæ, particularly of the elegant Belionota sumptuosa. One of these is now on the bridge,—he rises as I approach,—flies with the rapidity of lightning around me, and settles on the handle of my net! I watch him with quiet admiration,—to attempt to catch him then is absurd; in a moment he is off again, and then settles within a yard of me; I strike with all my force, he rises at the same moment, and is now buzzing in my net, and in another instant is transferred in safety to my bottle: I wait a few minutes here in hopes that another may be heard or seen, and then go on; I pass some fallen trees, under which are always found some Curculionidæ, species of Alcides and Otops,—these I sweep carefully with my net and get two or three specimens, one new to me. I now come to a large Boletus growing on a stump,—I push my net under it, two Thyreopteræ run on to the top, I knock one with my hand into my net, while the other has instantly escaped into a crack in the stump and is safe for this day, but his time will come. In some distance now I walk on, looking out carefully for whatever may appear; for near half-a-mile I see not an insect worth capturing; then suddenly flies across the path a fine Longicorn, new to me, and settles on a trunk a few yards off. I survey the soft brown mud between us, look anxiously for some root to set my foot on, and then cautiously advance towards him: one more step and I have him, but alas! my foot slips off the root, down I go into the bog and the treasure escapes, perhaps a species I may never obtain again. Returning to the path, another hum salutes my ear, and the fine Cetonia, Macronota Diardi, settles on a leaf near me, and is immediately secured: a little further, a yellow-

powdered Buprestis is caught in the same manner. Having reached the usual limits of my walk in this direction, I turn back and am soon rewarded by what appears a Colliuris sitting on a leaf, but which is discovered, on capturing it, to be of the equally acceptable Longicorn genus Sclethrus: a little further and a true Colliuris is caught. These insects I have named, from their elegant form, lady-beetles, English names being necessary for the use of my boy Charley, who is now a rather expert collector. During the rest of the walk back, the principal insects I get are two velvety Elaters crawling on the logs, and two or three curious Heteromera in the same situation. Returning by the Chinamen's houses, I find, at an odoriferous puddle, the fine Papilio Iswara, which I capture, as well as a P. Evemon and P. Sarpedon. I then walk to the other clearing, where, among the fallen timber and branches, I get several small Buprestidæ; numbers of the handsome red Eurycephalus maxillosus are here constantly flying about and crawling on the timber. On one tree I find running about with ants, which they much resemble, the curious little short-elytra'd Longicorns, Hesthesis sp. Here also, I get two or three pretty species of Clytus and a Callichroma. Between whiles I have picked up a few flies, wasps and bugs, and have got tolerably filled bottles. Returning home, I find Charley has also had a fair day. We empty our bottles into boiling water, and on pinning and setting our captures, find we have got between us 94 beetles, 51 different species, 23 of which are new to my collection: I have 5 new Longicorns, 2 new Buprestidæ, and 5 new Curculionidæ. I have been out five hours, and consider this a very good day's work. It will be seen that a far larger number of insects can be collected in a day in England, but perhaps hardly such a large proportion of species.

A. R. Wallace.

Occurrence of the Honey Buzzard (Falco apivorus) *near Truro.* — A specimen of the honey buzzard was shot last week at Carclew, the residence of Sir Charles Lemon; and it appears that this is the second instance of its occurrence in the same locality, and the only two recorded instances of its appearance in this county. The specimen that was obtained some years since, and which I was previously unaware of, I had an opportunity of cursorily inspecting yesterday at the Royal Institution's Museum at Truro; and it appeared to have a greater preponderance of brown both on the upper and lower plumage than the one recently killed. The under parts are rufous-brown, with a few narrow, transverse bars of white, about six in number, at some distance

from each other: in the specimen just obtained the under parts are creamy white blotched with light rufous-brown, becoming more transverse towards the lower parts. The feathers of the upper breast and throat have a very dark hair-like streak down the shafts of each feather, very distinct and remarkable at some distance. The variations in the plumage of this species are apparently so frequent that it is often difficult to determine the sexual distinctions, as well as the signs of the adult and unadult state of its plumage. Authors, I observe, give the female two shades of brown to her breast and belly, and more or less white to the immature bird's head and neck. The specimen lately obtained from Carclew, and which is now before me, proved on dissection to be a young male. There is no white about the head, and the fore part of the head and the whole of the region of the eyes are of a dull bluish ash. The tail has no distinct bar, but the upper third presents a darker shade of brown than the lower part; the tip to the extent of an inch almost black. The iris, which I examined in the flesh, bright yellow.—*Edward Hearle Rodd; Penzance, June* 30, 1855.

Occurrence of the Roller (Coracias garrula) *in Suffolk.*—A specimen of this rare and handsome bird was shot on the 28th of May, at Honiton, near Somerleyton. It proved to be an adult female.—*H. Stevenson; Norwich, June* 25, 1855.

Occurrence of the Pectoral Sandpiper (Tringa pectoralis) *on the Coast of Northumberland.*—A mature female of that rare bird, the pectoral sandpiper was shot by Mr. R. Duncan, of Newcastle, on the Northumbrian coast, near Whitley, on the 27th of June last. It agrees in every respect with the description of that species by Mr. Yarrell, and, as in his instance, it showed a great partiality for sitting on sea-weed, always, when disturbed, flying from one heap to another, uttering at the same time a loud and peculiar note.—*Thomas John Bold; Angas Court, Bigg Market, Newcastle-on-Tyne, August* 2, 1855.

Occurrence of large Flocks of Crossbills near Hull.—We have lately had a very large arrival of crossbills, large flocks having been seen in various parts of the country in this neighbourhood. I have myself noticed on several occasions small flocks flying about in the vicinity of the town, their presence being indicated by their peculiarly lively call-note. I saw a gentleman this morning (from a village near the shores of the Humber), who said they abounded there in extraordinary numbers, the flocks arriving early in the morning from over the sea, and flying eastward at a great height. During the daytime, when congregated in the trees, they allowed their numbers to be much thinned by the gun without being much disturbed. Parties who shot them for food reported them to be very good eating.—*G. Norman; Beverley Road, Hull, August* 7, 1855.

Note on the destruction of Swallows, &c., by the severity of the weather.—I have been somewhat surprised that none of the correspondents of the 'Zoologist' have alluded to the remarkable destruction of Hirundines and other birds which occurred at the end of May in the present year. I have traced this destruction over many portions of Derbyshire, Nottinghamshire and Leicestershire; and it is probable that it was not confined to the midland counties. The night of the 30th of May was extremely cold, and on the 31st numbers of the chimney swallow (*Hirundo rustica*) were found dead in various parts of Derbyshire. Four were found in the court-yard at Melbourne Hall, and many lying at intervals on the banks of the pool. The margin of a small rivulet below King's Newton was dotted with them at intervals for more than a mile: apparently they had tried to gain the bushes whereon to roost, and

failed from exhaustion. On Newton-field farm thirty were picked up. On the evening of the 30th swallows were exceedingly tame: many were knocked over by boys with sticks and stones. Some labourers who came over Swarkeston Bridge noticed great numbers settled on the parapets and the road, scarcely able to crawl along. Those that died were very poor; indeed, I knew an instance in which some seemed driven to such extremities that they came and fed with some pigs out of the pig-trough. A few days previously the weather had been warm, and brought out numerous insects, which the returning cold had killed, and the swallows in many cases died for lack of sustenance. This was evidently not the case with all. Upon examining the bodies of several I found the feathers much cut and mutilated, and many of the tail-feathers were completely knocked out; and I have no doubt such birds were killed by the hail-stones which fell on the 30th, and which were driven about with great force by the wind. Many swallows were found dead, floating upon the surface of the Trent, and lay with their wings expanded as if they had been suddenly checked in their course while flying. Very few swallows escaped with life. I never heard that any swifts or sand martins died, but the common martins suffered considerably. On the 30th of May a curious circumstance was noticed in the market-place in Derby. Against the ledges of the windows of the New Assembly Room the martins clustered together by hundreds, for the purpose of keeping themselves warm. Several which I saw fell to the ground, not being able to sustain their position on account of their weakness. At Chesterfield, Ashbourne, and indeed over a considerable portion of Derbyshire, the destruction of these birds was extensive. In Leicestershire many were picked up near Castle Donington, on the borders of Donington park, Wilson, and other places. Near Ratcliffe and Holme Pier Point, in Nottinghamshire, the destruction was general. Large numbers suddenly disappeared, and were afterwards found dead in sheds and covered places, in which they sought a friendly shelter. On the premises of the Rev. J. J. Peach, near Ratcliffe, thirty were found, and more than one hundred between that gentleman's residence and the village. At Wilford hundreds of swallows congregated on the roof of a house of a gentleman resident there, and after remaining the whole of the night, and also the next day, dropped off the roof by scores in a perfectly lifeless state. No wonder that these interesting little beings suffered so much, when at High Oakham, in the same county, the cold was so excessive as to cause the death of three sheep which had been recently clipped. Numbers of the landrail and other migratory birds fell a sacrifice to the cold weather. In the parish of Melbourne, Derbyshire, more than a dozen were picked up dead and very poor. Those that escaped had the eggs, which they were incubating, spoiled. Indeed, the weather seems to have caused great irregularity in the incubation of the eggs of the landrail. I found in the same field a nest containing eleven eggs not incubated, a brood of young birds just hatched, and some also about three weeks old and nearly feathered. Many broods this year consist merely of from 2 or 3 to 5 or 6 birds instead of 12 or 13. With partridges this is also the case in many localities, and I believe also with grouse. *John Joseph Briggs; King's Newton, Swarkeston, Derbyshire, August*, 1855.

Occurrence of Buonaparte's Gull (Larus Buonapartii) *on the Irish Coast.*—On Wednesday, the 14th of February, 1855, Captain Watkins, a brother-officer of mine, shot a gull on the coast near Skerries, about 17 miles north of Dublin, which is pronounced by all the Natural-History societies of Dublin to be Buonaparte's gull, of whose occurrence I believe there are but two previously recorded instances in Great Britain. The bird has been preserved and mounted by Mr. Baker, of Grafton Street,

Dublin, and is now in Captain Watkin's collection.—*T. L. Powys; Mount Wise Barracks, Devonport, May* 21, 1855.

Child and Snakes.—A man and his wife, in humble circumstances, by the name of Hill, live in Gilmanton, about two miles from London Ridge. They have several children, and among them a bright little girl, six years old, who, some six weeks ago, got into the habit of going out and spending part of the day away from home. The father worked out at day's work and the mother was busy at home, and not much notice was taken of it, though the girl remarked upon what nice times she had with her pets in the bushes, and several times spoke about the snakes. It was supposed that she spoke figuratively, as children are apt to do, representing their dumb playthings as possessed of intelligence. One night she stayed out till past nine o'clock, and her parents went out and called for her, but she did not answer. After a while she came home, and reluctantly told that she had been playing with the snakes. The mother's anxiety became great, and the next morning she persuaded her husband, before he went to his work, to go with the girl and see if she found any snakes. They went off, and waited a moment, and out came two black snakes, the one a little over four feet long, and the other a monster of his kind, judged to be between six and seven feet long. The father looked with astonishment and fear as he saw the snakes hasten with joy to the feet of his child, and yield delighted to her fondling caresses, coil themselves lovingly about her neck and bosom, crawl into her lap and cuddle down together in child-like security, and apparently fall to sleep while she patted and gently stroked them with her tiny hand. The father became indignant, and ordered his daughter to go home if these were her playmates. He went off to his work, and she remained with the snakes in spite of his orders. So things rested for a few days, an older sister going with her and seeing her play with and feed the disgusting reptiles. At last the parties became much excited about the matter, the mother threatening to shoot the snakes if the father did not, the child protesting. But the prevailing idea, that if you kill the charmer the charmed one will languish and die, induced him to consult Dr. Wight, who advised him not to kill the snakes. Last Sunday morning Mr. Hill, with gloves upon his hands, started in pursuit of the snakes. He found the smallest one, and chased it a long distance before it stopped so that he could get hold of it. At last he succeeded in catching it, and now keeps it secured in a sugar-box. It is cross to the rest of the family, but some of our informants have seen it coil itself about the neck of the little girl, fold itself to sleep in her lap with the fondness of a pet lapdog. It eats freely when fed by her, but seldom when fed by others. The little girl was asked if she was not frightened when she first saw the snakes. She said she was terribly frightened; and when asked why she did not run, she said she tried to, but could not; she also tried to scream for her mother, but could not speak a word. The idea was that she was paralyzed by the magnetic power of the snakes. The first time she remained with them a very long time, could not tell how long. Afterwards daily she staid with them several hours, feeding them regularly. She says they liked sweet things best, and that she stole three cakes of maple-sugar that her mother had laid away, and sweet gingerbread whenever she could, to give them. The big snake would try to drive the small one from her when fed, and she cuffed him several times,

and he returned the compliment by taking her fingers into his mouth several times, without doing much harm. Consequently she don't love this snake as much as she does the other one, though he is generally fond of her. The parents, with the little girl and snake, are now on a visit to this city, for the purpose of receiving such aid as the minds of scientific men can bring to them. They have been visited in their rooms by many citizens since their arrival, on Friday; and the deep interest which the entire community feel in this very remarkable case, together with the curiosity manifested to see them, has induced Mr. Hill to prolong his visit for two or three days, for the purpose of giving the public such an opportunity at Cochituate Hall, Tremont Street, near the head of School-street, on Monday, Tuesday and Wednesday afternoons, July 23rd, 24th and 25th, from two o'clock till five p.m. His stay must of necessity be brief and cannot, by any possibility, be extended beyond this time.—*Boston (U.S.) Evening Gazette, July* 21, 1855.*

Gonepteryx Rhamni double-brooded.—I only saw the May, June and July numbers of the 'Zoologist' a day or two since, and was not previously aware of the discussion as to whether G. Rhamni is or is not double-brooded. Mr. Bree's letter compels me first to make a few remarks upon the meaning of the term double-brooded. Until I read his communication I never supposed that it was applied to a species which does not go through all its changes twice in one year; in other words, which has not two distinct broods in each season. An insect which is hatched from the egg in the spring, goes through its changes during the summer, and produces the perfect insect in the autumn, hybernates, and reappears in the spring, cannot possibly be called double-brooded; and this is the case with G. Rhamni. There is most certainly but one brood in the year. I have reared numbers from the eggs, and can speak positively on the subject. The female butterfly deposits her eggs about the middle of April, upon the shoots of Rhamnus catharticus and R. Frangula; and in a lane near this place, where the former species grows intermixed with dogwood, whitethorn, blackthorn, &c., I have often watched the female, and observed how unerringly she distinguished the shoots of the buckthorn, never depositing an egg upon the twigs of the other shrubs with which it was closely intermixed. These eggs hatch early in May, and the larvæ are full-grown about the end of June; they then assume the pupa state, and in twenty days the butterflies come forth, that is, about the end of July, and they continue to appear till the middle of August. These specimens hybernate, and reappear in the spring. A moment's consideration must convince any one that the statement in Humphrey and Westwood's work, that a fresh brood appears in May, is incorrect: the insect could not possibly go through its changes in so short a time. The perfect state of some of the specimens which appear in spring is no proof that they have not hybernated; but I must say that I have never seen one equal to those found in August. Still, I admit that many are in good condition; but it must be remembered that numbers become quiescent very soon after they have emerged from the pupa state, and appear in spring almost as fresh as when first hatched. That

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* Obligingly communicated by William Yarrell, Esq.

this species sometimes exists very nearly a twelvemonth in the perfect state is a fact, having myself had a female alive from August till the beginning of May; and I have seen specimens in June which were most certainly disclosed the previous summer. Many species which hybernate live as long, especially in cold, backward seasons. An outhouse on my premises is a very favourite hybernating-place with Gonoptera libatrix. I have often seen two or three dozens sitting on a beam. They first enter the place at the end of August, very soon after emerging from the pupæ; and this year, owing no doubt to the cold, late spring, some of them did not move till the middle of June; and last night (July 13th) I saw three or four specimens at sugar, which of course had survived the winter, and were still in very good condition. Before quitting the subject I may just observe that in warm seasons a few specimens of species which are usually single-brooded will appear in the autumn, but they are invariably barren. Last autumn I had the eggs of a female Aplecta occulta sent to me. When they hatched, a few of the larvæ grew much more rapidly than the others, became pupæ, and in October produced fine specimens of the imago, the larger portion of the larvæ at that time being very small, and having ceased feeding for the winter. The same thing has occurred with Aplecta herbida, Cerura furcula, &c.—*Henry Doubleday; Epping, July* 14, 1855.

Gonepteryx Rhamni double-brooded.— On this subject the 'Zoologist' contains the opinions of three naturalists: first, that of Mr. Hawker (Zool. 4650), that the species is double-brooded; second, that of Mr. Newman (Zool. 4706), that there is but one brood during the year; third, that of Mr. Bree (Zool. 4740), that there are two flights in the year, with a disposition to believe there are two broods also within that period; and, lastly, there are the funny remarks of Mr. Hawker (Zool. 4765). Now, it is very curious that three persons who have had opportunities of observing should have written on this subject, and yet have advanced nothing more than "opinions" about the matter. Not a word is said about the history of the insect, except the quotation from Haworth, that both "males and females live through the winter," and that "the female deposits her eggs in the spring." I have a fact to state which is a real step towards settling the point in dispute; but first I wish to remark on the theory set forth by Mr. Bree, that "the perfectly fresh and brilliant condition in which some at least of the vernal specimens appeared showed that they could not have hybernated, but must have emerged from the chrysalis at that early season." The "practical entomologist" who made this profound remark could have had very little experience on the subject of which he spoke; for it is well known that, as a rule, the specimens of such species of insects as hybernate lay up for the winter almost immediately upon exclusion from the chrysalis. They thus get no injury by flying, and, as many would remain during winter in places quite secure and defended from the weather, such specimens would emerge in the spring perfectly fresh and brilliant. Mr. Hawker's observations may very well be left for Mr. Newman to reply to: it appears to me that he makes out from Mr. Newman's words a great deal more than they imply; and the inferences are very curious. Now for my fact. On the 31st ult., at Mickleham, I saw plenty of the larvæ of G. Rhamni, in all stages of growth, on Rhamnus cathartica, and saw a *faded imago flying*, but could not catch it. On the 5th inst., at Darenth Wood, the larvæ, also of various sizes, were abundant on Rhamnus Frangula; and I caught, flying, a female imago, of which the colour is faded and the wings ragged. I could from these facts easily build up a theory which would read as well as some we have had before us; but I only say that the caterpillars I saw must be the

first brood, because there were no leaves on the trees to nourish one earlier; and it now only remains for some one to find a second brood this year to establish that the species is double-brooded. The condition of the female I caught, taken, be it noticed, at the time some of the larvæ were full-fed, shows that it could have belonged to no "summer" brood. The larvæ I found will be butterflies in August. The second brood of larvæ therefore must be looked for in August, and I hope whoever finds will inform us.—*J. W. Douglas; Lee, July* 12, 1855.

Gonepteryx Rhamni double-brooded?—Before touching upon this *vexata quæstio*, will you allow me to intrude upon you the answers I have received from my friend Professor Zeller to the first four somewhat similar questions I propounded at page 150 of the 'Entomologist's Annual':—

"1. Papilio Machaon. The Machaon which you saw on the 25th of May at the Forester's house had that month escaped from the pupa, which had wintered, and of which the larva had lived in August and September (probably on Athamanta Oreoselinum). Its subsequent appearance takes place in July and August, from the eggs laid in June. Two broods in the year are in our neighbourhood past all doubt, and there appears no reason why in England it should only be single-brooded.

"2. Colias Hyale flies at the end of May and beginning of June, and has then escaped from pupæ of which the larvæ, of various sizes, had wintered. Its later appearance is from July to late in September. The latter specimens are probably all descendants of the Hyale which fly in May; since from eggs which I collected in July, and the larvæ from which I fed with their favourite plant, Trifolium repens, I obtained a male butterfly on the 3rd of September. The females which come out at that time certainly lay eggs, from which in about ten days the larvæ proceed, which on the approach of frost seek their winter-quarters. Thus this species is certainly *double-brooded.*

"3. Melitæa Selene appears with us in August, not scarce, in the same places which it frequents in May and June. Euphrosyne is too scarce here for me to have observed it twice a-year; but I doubt not that where it occurs abundantly it is *double-brooded.*

"4. Argynnis Lathonia, quite certainly *double-brooded;* flying in June from larvæ that have wintered. The summer brood appears in August, and continues till late in September. As in Hyale, it is much more plentiful than the spring brood; whilst the reverse is the case with Selene."

In the two first of these instance we have the insect traced through its various stages of egg, larva, pupa and imago, and, insects all being subject to these metamorphoses, that seems the rational mode of proceeding in an argument on such a subject. Now, to apply this to Gonepteryx Rhamni, do not the hybernated females lay eggs in the spring?—do not these eggs produce larvæ which feed up in May, and furnish the perfect insect in June?—do not these latter lay eggs which produce larvæ that feed up in July?—and do not these larvæ furnish the autumnal and *most plentiful* brood of the imago of G. Rhamni? I pause for an answer to these inquiries. It seems to me the height of absurdity that *we know* that Nepticula anomalella and N. marginicolella are double-brooded, and that we have good grounds for believing that Nepticula angulifasciella and N. viscerella (though respectively feeding on the same plants, rose and elm) are single-brooded, and yet no entomologist exists in Britain sufficiently observant to have noticed the transformations of G. Rhamni, the double-broodedness of which was

never questioned till the Editor of the 'Zoologist' thought he had discovered—a mare's nest.—*H. T. Stainton; Mountsfield, Lewisham, July* 11, 1855.

Occurrence of Vanessa Antiopa in North Wales.—On the 30th of last June I saw a fine specimen of Vanessa Antiopa near Llyn Ogwen, Caernarvonshire, North Wales, but did not secure it.—*Samuel Price;* 44, *Bell Barn Road, Birmingham, August* 4, 1855.

List of a few rare Lepidoptera captured in Wales.—I have collected during the greater part of the last three summers in this valley, and, as very few Welch localities have appeared in the 'Zoologist,' have sent a short list of some of my rarer captures, and hope that as a small contribution towards a better knowledge of the entomological productions of the principality it will be acceptable. I have no doubt that, if thoroughly worked, Wales would prove quite as rich in novelties, for its extent, as Scotland has done.

Trochilium sphegiforme. In June, 1854, I bred a female of this fine insect, and took three males at liberty; and in July this year I had again the good fortune to meet with it.

Luperina furva. Many specimens came to sugar from the middle to the end of July this year, all males. In 1853 I took several off the flowers of Scabiosa columbaria, from the middle to the end of August, all females.

Spælotis cataleuca, Agrotis Ashworthii. Both came to sugar during July. They appear to be exclusively attached to the limestone, and are rather local there. I took a single specimen of the latter species on the 20th of July, 1853, about a mile from the nearest limestone, but have not since met with one even on trees only a few yards off. They seem to secrete themselves during the day amongst the loose, broken stones lying at the foot of the rocks, and are very much infested with a scarlet Acarus. Two females of Ashworthii laid eggs in the ropes: these were at first of a pale straw-colour, but on the fourth day changed to a delicate flesh tint, and assumed a dark pink spot at the apex, and a zone of the same colour round the middle.

Agrotis corticea is common in the same locality as the last, but has a much more extended range. I have taken it, but sparingly, in other parts of the valley.

Cerigo cytherea, Rusina tenebrosa, Noctua triangulum, Neuria Saponariæ, &c. All at sugar, in July.

Xylina rhizolitha. At sugar, October.

Harpalyce picaria. By beating hazel, beginning of July.

Homeosoma eluviella. At sugar, July 19.

Tinea semifulvella. By beating oak, May 18, July 16.

„ rufimetrella. By beating hawthorn, July.

Micropteryx Leppella. Common in June.

Nemotois Scabiosellus. I have several times seen the female in the position mentioned by Mr. Stainton, her abdomen thrust down amongst the florets of Scabiosa columbaria, and her wings lying expanded on the top of the flower; but have failed to detect either eggs or larvæ.

Cerostoma sequella. By beating Acer campestre, in September.

Cleodora Cytisella. Common amongst brake, July and August.

Œcophora grandis. Not uncommon in the end of May and June, in one fence composed, like most of them in this neighbourhood, of a mixture of dead and living hazel; in this one, however, mixed with some dead birch. They fly only in warm sunshine, from 10 a. m. to 1: when the sun is off the fence they cannot be made to fly.

I think they secrete themselves in dead leaves on the ground, they so soon become worn.

Pancalia Latreillella. Very scarce in the same fence as the last, May 27 and 28.

Argyresthia glaucinella. Taken sparingly from the middle of May to the end of June, sitting on the trunks, and beaten from the branches, of three or four very old, half-decayed oaks.

Chauliodus Chærophylellus. From the beginning of October to the end of June.

Elachista Gangabella? By beating hazel, May and June.

Lithocolletis Roboris. Not uncommon in May.

„ hortella. One specimen, May 15.

„ tenella. Scarce. Middle to end of May.

—*John S. Ashworth; Bryn Hyfryd, Llangollen, North Wales.*

Occurrence at Richmond, Surrey, of a Coleopterous Insect new to Britain.— Four or five years ago I was waiting in the garden belonging to the Union at this place for a friend who had gone into the house to see one of the inmates, and, entomologist-like, I occupied the time in examining the surrounding paling. Along with some other things, I captured what I imagined was a specimen of Tamicus bidens, but, finding on after examination with my friend Mr. Dawson, of Geodephagous celebrity, that it certainly was not that, and not being able to identify it, by his advice it was sent to Paris, whence it was returned as Bostrichus bispinus of Megerle, with the remark, "Je le crois inédit." I know not whether it has ever appeared in printer's ink; but at any rate, not wishing to add to synonyms already sufficiently numerous, I shall attempt to give a description, under the above cognomen, sufficient to enable it to be recognized if it has occurred elsewhere in this country. Slightly shining, with scattered hairs; thorax pitchy chestnut, darkest in front; elytra paler, a dark testaceous. The thorax is rather narrowed in front, where it is studded with tubercles arranged somewhat in curved rows parallel with the anterior margin of the thorax, which appears to be slightly reflexed. The remainder of the thorax is punctured, with a ridge in the centre extending from the tubercled portion to the hinder margin. Elytra punctured, with a single shallow stria on either side the suture. Apex retuse from the sudden widening of the sutural striæ, and the upper edge armed with a tooth as in bidens, but larger, curved and claw-like; in advance of each tooth is a small tubercle. The limbs were not set out, and now that it is old and dry I do not wish to incur the risk of attempting it, so that further details cannot be added; but I think enough is given above (and probably more than enough) to enable any captor of the species to recognize it. I am aware that the occurrence of a single example of a species is slender ground for admitting it into our Fauna, especially when it belongs to the Xylophagous tribe; but the locality in this case does not appear to be a suspicious one; and, as I have never searched it since, it is possible that a further examination, which I intend to make, may lead to the capture of other examples.—*George Guyon; Richmond, Surrey, April* 28, 1855.

Great abundance of "Clegs" in Cumberland and Northumberland.—I certainly never recollect such a plague of "clegs" (*Hæmatopota pluvialis*) as our district has this season been visited with. When in Cumberland, in the second week of July, they were in such numbers on the moors and other elevated places that I was frequently driven from my pursuits by the pertinacity of their attacks. The same abundance was noticed in many parts of Northumberland; indeed, they are said to have been in such force in some places as to be a perfect torment to man and beast. This I can readily

believe, as my face and hands were much swollen by their villanous bites.—*Thomas John Bold; Angas Court, Bigg Market, Newcastle-on-Tyne, August* 3, 1855.

Duplicates of the Genus Colymbetes.—The water-net has produced duplicates of the following species of Colymbetes: I shall be much pleased to send them to any entomologist as long as the store holds out: C. oblongus, *Ill.*, chalconotus, *Pz.*, maculatus, *Lin.*, vitreus, *Pk.*, Sturmii, *Gyll.*, bipustulatus, *Lin.*, ater, *Fabr.*, obscurus, *Marsh*, angustior, *Gyll.*, fuliginosus, *Fabr.*, pulverosus, *Knoc.*, exoletus, *Fors.*, and bistriatus, *Bergst.* I shall be much obliged for specimens of the following species, which do not appear to be metropolitan: C. arcticus, *Pk.*, fontinalis, *Ste.*, congener, *Pk.*, uliginosus, *Pk.*, dispar, *Bold*, brunneus, *Fabr.*, notatus, *Fabr.*, and adspersus, *Fabr.* I wish it to be distinctly understood that my offer to distribute duplicates is quite unconditional, and not in any way dependant on gifts I may receive. I hope this mode of advertising entomological duplicates and desiderata will be followed by my readers: the pages of the 'Zoologist' are at their service, and there is no longer any duty on advertisements.—*Edward Newman.*

Enormous Flight of Ephemeræ.—As we were steaming down the Rhine, and near Bonn, with a brisk breeze up the river, we became aware of an appearance as if a heavy storm of snow were coming up against us: we were soon in the midst of a shower of Ephemeræ, all in an immature state, having the wings opaque and white: they fell in multitudes on deck, drifting in places into white snow-like masses. The storm continued for miles, the poor things being driven before the wind with that confused indeterminate motion we so often see in flakes of snow.—*Henry Newman; Brussels, August* 11, 1855.

Short Directions for the Management of Marine Vivaria.—I am preparing a handbook on the management of marine vivaria, but as my time will not admit of its publication forthwith, and being deluged with applications from friends requiring to be fairly started, I have thought it right to send to the 'Zoologist' the heads of what I consider to be of vast importance, and which, if fairly carried out, will repay those who attempt it with the success equal to that obtained by myself and others.

First.—When you have obtained your tank, in the first place build up your rockwork: when the cement is set, soak the tank well, that it may be perfectly cleansed from oil and other noxious substances. Coral rag is the best rock for the purpose.

Secondly.—Place your shingle and sand at the bottom of the tank, and then pour gently on it the sea-water; leave it for a day, and the sand which was stirred up will subside; you can then put in a little more shingle when required.

Thirdly.—Obtain your sea-water, when possible, from the western coast; it is much purer than that on the eastern coast. Use a pine cask for the conveyance of the water; oak casks are injurious, from the tannic acid they contain, and casks that have contained fermented liquors are especially deleterious. When the water in the tank has cleared itself, place the weeds in it, and place the tank where the sun can shine on it for at least two hours during the day.

Fourthly.—When the weeds throw off pretty freely bubbles of oxygen you may safely put in some animals; Actiniæ are good ones to commence with: add the animals gradually, until the tank is properly established.

Fifthly.—In placing in old shells and *débris* watch carefully that there are no dead animal matters attached. The Annelides are very prone to die and form a nucleus of putrefying matter: it is better not to place in any Annelides until the tank is established; the death of a few is then of slight importance.

Sixthly.—All large stones should be raised a little from the bottom, so as to allow a wash under them, and also the Crustacea to cleanse all the dead animal and vegetable matter: this will prevent the black deposit, which is a sure sign of sulphuretted hydrogen.

Seventhly.—Do not discourage the confervoid growth on the sides of the tank, until the tank is perfectly established; its occurrence is a sure sign the water is in good condition, and it is my opinion it oxygenises the water more effectually than do the larger plants.

Eighthly.—Syringe the water at times; it can do no harm, and the animals appear to like it.

Ninthly.—Do not overcrowd your tank.

Tenthly.—Remove animals as soon as they are dead.

Eleventhly.—Use sea-water in preference to any salt and water.

I am confident that if the above very simple rules are attended to the owners of vivaria will find success the rule and failure the exception. What is to prevent them being as successful as the Zoological Society? it is to Mr. Mitchell's care and attention that their success is due. I am now engaged in maturing a new plan for transporting some of the animals and all the weeds, and which, if successful, will lessen the carriage considerably, and also lessen the risk of death amongst them. I shall be much obliged to any gentleman who can give me any hints or advice, and who will allow me to make use of it in my forthcoming hand-book, all of which shall be duly acknowledged. Any information of experience as to the shapes, dimensions and prices of tanks will be acceptable. I myself incline to a shallow tank with a large area.—*William Thompson: Weymouth, August* 11, 1855.

Proceedings of Societies.

Entomological Society.

August 6, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Literary Gazette' for July; by the Editor. 'The Athenæum' for July; by the Editor. 'Journal of the Society of Arts' for July; by the Society. 'Journal of the Royal Agricultural Society of England,' Vol. xvi. Part 1; by the Society. Hewitson's 'Exotic Butterflies,' Part 15; by W. W. Saunders, Esq. 'Die Gallen. Versuch die durch Insecten an den Pflanzen Verursachten Answüchse nach ihren Haupttypen und Wachsthumsverhältnissen naturgemäss zu gruppiren,' von Georg Frauenfeld; by the Author. 'Revue et Magasin de Zoologie,' 1855, No. 6; by the Editor, M. Guérin-Méneville. 'List of the Specimens of Lepidopterous In-

sects in the Collection of the British Museum,' Part III. Lepidoptera Heterocera; by the Author, Francis Walker, Esq., F.L.S. A box of Indian insects; by Major Hamilton. A specimen of Sirex gigas; by G. H. Drew, Esq. Bembidium Clarkii (6) and Bembidium obliquum (8) from Northamptonshire; by the Rev. Hamlet Clark.

Election of Members.

Mons. F. Pictet, Professor of Zoology and Comparative Anatomy in the Academy of Geneva, was elected an Honorary Member in the room of Dr. De Haan, deceased; and Edward Henry Burnell, Esq., 32, Bedford Row, was elected an Ordinary Member of the Society.

Exhibitions.

Dr. Power sent for exhibition some rare British Coleoptera, including Agrilus chryseis, Anthraxius nitidula, Rhyncolus ater, Microrhagus pygmæus, all from the New Forest, and Drypta emarginata (2), recently taken by himself near Portsmouth.

Mr. Bond exhibited some Lepidoptera recently taken by him in Cambridgeshire: the more remarkable species were Pionea margaritalis, Nascia cilialis, Eupithecia sparsaria, Anesychia funerella, Opadia funebrana, Argyrolepia Schreibersiana, and a singular dark variety of Arctia villica.

Mr. Baly exhibited a specimen of Cryptocephalus nitens, taken from an ash tree at Cobham, Kent. Mr. Stevens said he captured an example of this species yesterday on a birch tree at Mickleham.

Mr. Doubleday sent for exhibition specimens of Caradrina blanda and C. alsines, species quite distinct, but mixed in collections under the former name.

Mr. Weir exhibited a remarkable variety of Anthrocera Filipendulæ, with only five spots on each of the upper wings, taken *in copulâ* with an ordinary six-spotted specimen. He likewise exhibited Penthina sauciana bred from Vaccinium myrtillus, Anarsia Genistæ bred from Genista tinctoria, and other rarities.

Mr. Dutton exhibited some Lepidoptera recently captured in the Isle of Wight, among which were fine specimens of Agrotis lunigera.

Mr. Douglas exhibited a specimen of Trochilium Chrysidiforme taken by Mr. J. A. Brewer, of Reigate, while sweeping for Coleoptera, near Dover, on the 25th of June last, and presented alive to Mr. Douglas. This species had hitherto only two British representatives; one, now in Mr. Edwin Shepherd's collection, stated in Mr. Stephens's 'Illustrations' to have been captured by Mr. Francillon; the other, in Mr. Curtis's collection, taken by Mr. Leplastrier near Dover.

Mr. Douglas also exhibited Asychna æratella from Darenth Wood, and Butalis fusco-ænea from Headley Lane: both species were taken last month.

Mr. Westwood exhibited a living scorpion brought from Mexico with plants for the Horticultural Society. He also exhibited eggs and living larvæ of the flea of the dog, and stated that Mr. Haliday had recently dissected some of the larvæ, and found that his former opinion, grounded chiefly on the characters of the perfect insect, that the flea belonged to the order Diptera, must be abandoned, and the insect referred to the distinct order Aphaniptera of Kirby. He added that the eggs of the flea were not attached to the surface on which they were laid, as had been stated; for upon moving the cloth or rug on which his dog was accustomed to lie the eggs rolled off.

Mr. Westwood exhibited a specimen of Ludius ferrugineus which he had had alive for a fortnight, and which was reared from an old ash tree by Mr. Boddy.

Mr. Westwood also exhibited specimens of the Saturnia reared at Malta from examples recently introduced from India as S. Cynthia; and he also exhibited specimens of the true Saturnia Cynthia received from Major Jenkins, in India, with a ticket attached stating that this was the species whose caterpillars produced the "Eria" silk. The difference between these specimens and those from Malta was so trifling that he thought Dr. Boisduval had scarcely sufficient grounds for making the Indio-Maltese species distinct from S. Cynthia, as he had recently done in the French 'Annales,' under the name of S. Ricini: he believed if the progeny of a single pair of S. Cynthia was distributed over a wide geographical range, that, after three or four generations, quite as much difference would be observed among the specimens as between these so-called distinct species.

Mr. Stevens exhibited a splendid butterfly, a new species of Agrias recently sent from Villa Nova by Mr. Bates.

Mr. Foxcroft sent for exhibition some Coleoptera and Lepidoptera recently taken in Perthshire. Among the latter were two Polia occulta, apparently differing from the general type of that species only in the darkness of their colour, but their larvæ were said to be totally unlike. This statement was corroborated by a note from Mr. Logan, of Edinburgh, read to the Meeting.

Abundance of Noctuidæ.

Mr. Douglas remarked that the number of Noctuidæ this season appeared to be unusually large near London, and he should like to know if this abundance was general.

Mr. Stevens said that on the previous night, at Mickleham, he saw 800 or 900 Noctuidæ attracted to sugar.

Mr. Westwood said other sweets than sugar were exceedingly attractive to moths: in his garden Noctuidæ abounded about a bed of beans which were infested with Aphides, whose excrement, as was well known, formed a sweet deposit; and they also swarmed around some gooseberry bushes, whose fruit, in consequence of the wet weather, had burst.

The President said that in a large conservatory near Alton he had lately seen large quantities of moths, which, attracted by the scent of the flowers, had entered by the open door and could not find their way out. He added, that Captain Chawner had told him that occasionally, at the lighthouse at Lowestoft, the moths abounded so much at night that the keeper had to sweep the lantern in order to clear them away.

The Society's 'Transactions.'

Part 5, Vol. iii., N. S. of the 'Transactions' was on the table.—*J. W. D.*

The following was read at the April meeting:—

Description of a New Species of Ornithoptera.

"Ornithoptera Brookiana. *Wallace.*

"Expansion 6½ inches. Wings very much elongated; black, with a horizontal band of brilliant silky green. On the upper side this band is formed of seven spots

of a subtriangular form, the bases of the four outer being nearly confluent, and of the three inner quite so, forming a straight line across the centre of the wing; the attenuated apex of each spot very nearly reaches the outer margin at each nervule. On the lower wings the green band occupies the centre half, and has its upper margin tinged with purple. The lower wings are finely white-edged. There are some azure atoms near the base of the upper wings. The collar is crimson, and the thorax and abdomen (?) black. Beneath black, upper wings with the green spots opposite the bases of those above, small and notched, the basal one with brilliant purple reflexions, also a purple streak on the anterior margin at the base. Lower wings with a submarginal row of diamond-shaped whitish spots divided by the nervures; base of wings with two elongated patches of brilliant purple. Body obliquely banded with crimson; abdomen black.

"Hab. N.W. Coast of Borneo.

"This magnificent insect is a most interesting addition to the genus Ornithoptera. The green-marked species have hitherto been found only in N. Australia, New Guinea and the Moluccas, and all those yet known so much resemble each other in their style of marking, that most of them have been considered as varieties of the original Papilio Priamus of Linnæus. Our new species is therefore remarkable on two accounts; first, as offering a quite new style of colouring in the genus to which it belongs; and, secondly, by extending the range of the green-marked Ornithopteræ to the N.W. extremity of Borneo. As it has not been met with by the Dutch naturalists, who have explored much of the S. and S.W. of the island, it is probably confined to the N.W. coast. My specimen (kindly given me by Captain Brooke Brooke) came from the Rejang river; but I have myself once seen it on the wing near Sarawak. I have named it after Sir J. Brooke, whose benevolent government of the country in which it was discovered every true Englishman must admire.

"Alfred R. Wallace."

Society of British Entomologists.

June 5, 1855.—Mr. Harding, President, in the chair.

Messrs. Kent and Doe were elected Subscribers to the Society.

The President exhibited specimens of the following insects:—Trochilium Culiciformis, Lophopteryx carmelita—he remarked that this insect had not been taken at Darenth Wood for nearly thirty years, Peridea trepida, Xylina conspicillaris, and many others: the whole of the above were taken at Darenth Wood during the past month (May).

July 3, 1855.—Mr. Harding, President, in the chair.

Mr. Miller exhibited specimens of the new Tortrix discovered by Mr. Harding feeding on the Eryngium maritimum, or sea-holly; also Cucullia Asteris, and a box of small Lepidoptera,—among others Gelechia tenebrosella, G. pictella, Œcophora Panzerella, Coleophora alcyonipenella, Elachista Gangabella, &c.—*J. T. N.*

Tyneside Naturalists' Field Club.

Meeting at Bothal.

The first meeting of the season of the Tyneside Naturalists' Field Club was held, by invitation of the Rev. Henry Hopwood, Rector, at Bothal and Sheepwash, on Monday, June 11th. According to previous arrangements, the party from Newcastle assembled at an early hour at the Central Station. On alighting at Morpeth they were joined by several other members, with whom they proceeded on foot, by the banks of the Wansbeck, to Bothal, and thence to Sheepwash, examining on their way the various objects of interest which came under their notice. On reaching Sheepwash they met with a kind and courteous reception from the Rev. Henry Hopwood, by whom they were most hospitably entertained. After luncheon, the members of the club, with some ladies who were visiting Mrs. Hopwood, having assembled on the lawn in the Rectory gardens, Mr. Sidney Gibson read a paper on the "History of the Church, Castle, and Barony of Bothal," which he had prepared at the request of the Rector,—first remarking that, as it was to be read upon the spot, his (Mr. Gibson's) object had been to give a brief historical sketch, rather than a description of the locality and its architectural remains.

With regard to the parochial history of Bothal, it would seem that the parish church had not originally nestled under the protection of the castle, but had been situated at Shipwash, much lower down the river. The tradition was that the church formerly standing at Shipwash (which was dedicated in the name of the Holy Sepulchre of our Lord), was the mother church of the parish of Bothal; and it continued to be a separate benefice until the year 1615, when it was annexed to the rectory of Bothal. From the dedication being in honour of the Holy Sepulchre, and from the fact that the Templars had a Preceptory at Chibburn, Mr. Gibson was disposed, however, to attribute the church to a period not earlier than the first Crusade, and to connect it with that illustrious order of military monks. At all events it was probable, he thought, that a church was erected on the site of the existing church of St. Andrew, at Bothal, soon after the reign of Henry I., when the Bertram family acquired those extensive domains. But there was reason to believe that a parish church existed at Bothal before the Conquest, inasmuch as the tithes were amongst the donations made by Robert de Mowbray, the great Norman Earl of Northumberland, to the monastery of Tynemouth. The present church of Bothal was dedicated under invocation of St. Andrew, who seems to have been the favourite saint of the great Wilfrid, in whose footsteps so many edifices of religion rose; but this circumstance alone (Mr. Gibson remarked) would not support a claim of such high antiquity for the church of Bothal. If any church existed here before the time of Athelstan it was probably destroyed by the Danes, and there was reason to believe that it was in ruin at the time of the Conquest. In glancing at the Anglo-Saxon period, Mr. Gibson shortly described the wanderings of the monks with the remains of St. Cuthbert, which had traversed part of the parish of Bothal on the flight from Durham to Lindisfarne in 1069, the monks having passed the Wansbeck at the ford of Shipwash, and rested at a spot in the chapelry of Hebburn, where the chapel of St. Cuthbert was afterwards founded. As regards the fabric of the existing church it appears to have been rebuilt, wholly or in part, early in the thirteenth century, and the chancel is of first pointed

architecture. The nave and aisles were replaced late in the fourteenth century by those now standing; and the edifice now consists of a chancel, nave, two aisles, a southern porch, and a campanile in which hang three bells. The clerestory is of elegant middle pointed work. Originally there had been a pointed roof of high pitch, but it was replaced by the present flat roof in 1496, when the living was sequestered for repairs. Bothal church is altogether an interesting edifice, and affords, as many other churches in Northumberland do, an example of the influence of military architecture and of the disturbed state of the Border lands on the form and fabric of the parish church. Thus, the square-headed trefoiled arch, which is common in castellated architecture, is found in many ecclesiastical edifices in Northumberland; and a castle being adjacent, we have a campanile instead of a tower. Passing then to the history of the castle and barony, Mr. Gibson traced the descent of the great family of Bertram, who seem to have acquired Bothal in or not long after the reign of William Rufus, their ancestor, Guy de Balliol, having received these possessions with the other confiscated estates of Earl Robert de Mowbray. Bothal was made a barony as early as the time of Richard Cœur de Lion, and the great baronial family of Bertram flourished here until late in the reign of Edward III. Robert Bertram, the last lord in the male line, seems to have been a man of great energy and martial spirit, and it was he who obtained the royal license to make a castle of his manor-house of Bothal. The noble gate tower, which is the only perfect portion remaining of the Edwardian Castle, is a well-preserved monument of his dominion. This martial chieftain fought at the battle of Nevill's Cross, and captured William Douglas. Malcolm Fleming, Earl of Wigton, was conveyed after the battle to Bothal Castle for safe custody, but was allowed to escape without ransom, for which the Lord of Bothal fell under the King's displeasure; but he seems to have died in the possession of power and honour, and on his death the barony and possessions descended on Helen, his only child, by whose marriage to Robert de Ogle, Bothal came to a branch of that ancient Northumbrian family. After his death the Lady Helen married three successive husbands. She founded a chantry in the church of St. Andrew, at Bothal, and is commemorated, together with her first husband, by the magnificent monument which forms so conspicuous a feature in the sacred edifice. Their posterity succeeded to the barony and possessions, and in their time, probably, additions were made to the castle. A survey made in the time of Elizabeth mentions, besides the Great Tower, the Blanch Tower and the Ogle Tower, all which have long been destroyed, though they were represented as standing in a view taken in 1728. Mr. Gibson said it was probably after the acquisition of Bothal by the Ogle family that the edifice known as the Lady Chapel was built. Its ruins stand higher up on the banks of the Wansbeck, on a spot where a hermitage was supposed to have existed. After tracing the descent of the barony and possessions of the Lords of Bothal to the Ducal House of Portland, Mr. Gibson read some characteristic extracts from the will of Robert, sixth Lord Ogle of Bothal, who died in 1562, and from the inventory of the furniture and effects in Bothal Castle at the time of his death. He also read, from the survey made in 1576, the description of the castle as it then existed, and of the kinds of fruit that were cultivated in its gardens, remarking that their record afforded us some glimpses of the life, habits and costume of the Border chieftain of the Elizabethan era. It was painful to contrast the now ruinous state of this castle with its former magnitude and strength; but the whole spot was suggestive of feudal memories, and invested with a picturesque beauty and interest which could hardly be exceeded even in any of the river valleys of Northumberland.

On the motion of the Rev. George Cooper Abbs, of Cleadon House, the thanks of the meeting were given to Mr. Gibson for his very interesting paper.

Exhibitions.

Mr. T. J. Bold exhibited a series of specimens of one of our wild bees and its parasite; the latter (Nomada borealis), he remarked, had hitherto been regarded as a very rare British species.

Two other insects (Hydroporus melanarius, *Sturm*, and H. elongatus, *Sturm*) were also shown, and were noted as additions to our catalogue of water beetles, having been taken by Mr. Bold at Prestwick Car.

The same gentleman communicated a notice of having observed a pied flycatcher in the vicinity of Newcastle, concluding by intimating that he was collecting materials for a catalogue of the Aculeate Hymenoptera of the district, and would be obliged for any assistance that the members could render him.

Mr. Storey laid before the meeting specimens of the mountain melic grass (*Melica nutans*), a species which he had met with during the day, and which he stated was new to the locality.

Election of Members.

The election of members was next proceeded with, when the following gentlemen joined this flourishing society, viz., Rev. Henry Hopwood; Rev. Edward Lacey, Bothal; Charles Gibson, M.D.; Messrs. Edward Spoor, A. M. Dunn, Thos. Stokoe, John Hopper (Newcastle), E. Finch (Blakelaw), and R. W. Swinburne (Cleadon Cottage).

The very cordial thanks of the party having been given to Mr. and Mrs. Hopwood and the ladies for their polite attentions, the meeting broke up.

NOTICES OF NEW BOOKS.

'*Annals and Magazine of Natural History.*' Nos. 91 and 92, dated July and August, 1855; *price* 2*s.* 6*d.* each. London: Taylor and Francis, Red Lion Court, Fleet Street.

No. 91 contains the following papers:—

'Observations on the Development of Gonidia (?) from the Cell-contents of the Characeæ, and on the Circulation of the Mucus Substance of the Cell: with a Postscript.' By H. J. Carter, Esq., Assistant-Surgeon H.C.S. Bombay.

'Descriptions of the Animals of certain Genera of Conchifera.' By S. P. Woodward, Esq., F.G.S.

'Notes on some New or little-known Marine Animals.' By Philip Henry Gosse, A.L.S.

'On the Homologies of the Carapace and on the Structure and Function of the Antennæ in Crustacea.' By C. Spence Bate, F.L.S., &c.

'On Double Monstrosity in Fishes.'

Proceedings of Societies:—Linnean, Zoological, Royal Institution, Botanical of Edinburgh.

Miscellaneous:—On the Nereis bilineata; by William Thompson. On a New Species of Thalassidroma; by George Robert Gray, F.L.S., F.Z.S., &c. On the Eggs of Otogyps and Prosthemadera; by H. F. Walter.

No. 92 contains the following papers:—

'Notes on Palæozoic Bivalved Entomostraca.' No. I. Some Species of Beyrichia from the Upper Silurian Limestones of Scandinavia.' By T. Rupert Jones, F.G.S.

'On the Conjugation of the Diatomaceæ.' By J. W. Griffith, M.D., F.L.S.

'On a New Genus of Fossil Cidaridæ, with a Synopsis of the Species included therein.' By Thomas Wright, M.D., F.R.S.E.

'Brief Notices of several New or little-known Species of Mammalia lately discovered and collected in Nepal, by Brian Houghton Hodgson, Esq.' By T. Horsfield, M.D.

'On the Assiminia Grayana and Rissoa anatina.' By William Clark, Esq.'

'Descriptions of Two newly-discovered Species of Araneidea.' By John Blackwall, F.L.S.

'Note on the Descent of Glaciers.' By J. Gwyn Jeffreys, Esq., F.R.S.

Bibliographical Notices:—Catalogue of British Hymenoptera in the Collection of the British Museum. Part I. Apidæ, Bees; by Frederick Smith, M.E.S. Proceedings of the Yorkshire Philosophical Society.

Proceedings of Societies:—Zoological, Botanical of Edinburgh.

Miscellaneous:—On the Organization of the Pedicellate Glands of the Leaf of Drosera rotundifolia; by M. A. Trécul [extracted from the 'Comptes Rendus,' June 25, 1855, p. 1355]. On a New Organ observed in Callitriche; by M. A. Chatin [extracted from the 'Comptes Rendus,' June 18, 1855, p. 1291]. Description of a New Tanager of the Genus Calliste; by Philip Lutley Sclater, M.A. [extracted from the 'Proceedings of the Zoological Society,' Nov. 14, 1854]. On the Spermatozoa of the Crickets; by C. Lespés [extracted from the 'Comptes Rendus,' July 2, 1855].

Mr. Spence Bate's paper on the Function of the Antennæ in Crustacea is highly interesting: after describing these organs with some care, he thus continues:—

"The next question which we have to consider is, to which sense either of these two sets of organs belongs; whether the upper belongs to the auditory and the lower to the olfactory, as I shall endeavour to prove, or *vice versâ*, as maintained by Prof. Milne-Edwards.

"We shall divide the evidences on either side under two heads; the first, that which is derived from an external observation; and the second, that which is derived from its internal organization.

"First, then, from external circumstances: an auditory apparatus is an organ furnished to an animal for one or both of two objects; first, for protection from danger; secondly, for the pleasure derivable from sounds. To animals so low in the scale of beings as the Crustacea, placed as they are in a medium which must considerably modify its character, sound can convey little to the consciousness of the animal beyond a sense of security or danger.

"To enable this to be of the most extensive value, the auditory organ must [be] and always is so placed as to be most exposed to external impressions at all periods; particularly when the animal is at rest or pre-occupied.

"Now if we look at the organ the present state of science attributes to the sense of hearing, we find that, in the most perfectly formed animals, the Brachyura, it is enclosed within a body case, and secured by a calcareous operculum; that it always is so in a state of rest, and only exposed when especially required. Not only is this the case throughout the order, but, in some genera, as Corystes, Cancer, &c., it is again covered by the supplying organs of the mouth.

"If we take into consideration that the inferior antenna is frequently developed into organs assimilating to feet, and frequently used for the purpose of assisting to climb, &c., it seems difficult to admit that it is an organ capable of protecting the animal by its quick detection of the sound of approaching danger.

"If we turn our attention to the superior antenna, we find that in the living animal it is always elevated in the water and never at rest,—always playing with a constant vibration and a jerking motion peculiar to itself in the higher orders. Among the Amphipoda, though constantly erect, the motion is more regular and graceful; this probably is consequent upon the greater relative length of the organ.

"This organ is one that appears as if always on the watch; let the

animal be at rest, let it be feeding, no matter, the superior antenna is ever elevated and on constant guard.

"Again, if we turn our attention to the land Crustacea, we find the organ as an antenna disappear; and in Ligia and the amphibious Orchestidæ they are rudimentary, as if the organ, passing from water into a less dense medium, required modification in order to adapt it to the change of circumstances.

"If we take into consideration the nature of sound, and its difference of character when conveyed under water from that of passing through air, the obtuse character of the former, which can scarcely be more than a vibratory action of particles of water, which conveys to us a very modified and imperfect idea of sound, we find it difficult to understand that the organ situated at the base of the under antenna is capable of receiving impressions of sound, enclosed as it is within and covered by a stout calcareous operculum.

"But if we view it as an organ of smell, every objection previously becomes evidence in favour of the idea. The small door, when it is raised, exposes the orifice in a direction pointing to the mouth; this also is the direction of the same organ in all the higher orders. In Amphipoda it is directed inwards and forwards. In every animal it is so situated that it is impossible for any food to be conveyed into the mouth without passing under this organ, and of this the animal has the power to judge its suitability for food by raising the operculum at will, and exposing to it the hidden organ—the olfactory.

"If we turn to the upper antenna, we find that its position, form and power are as capable of fulfilling the office of conducting the sensation of sound, as the lower is that of smell. As I before observed, it is always placed erect, and continually feeling in the water for the first approximation of sensation. The filamentary appendages are always two or more, one of which is supplied with singularly delicate membranous cilia, being apparently prolongations of a similar membrane to that which covers the larger orifice of the olfactory organ. These lengthened and delicate cilia are peculiarly adapted to receive and convey the most minute vibratory sensation of the medium in which they are suspended. These organs when spoken of may conveniently be designated as auditory cilia, and have been found in every species of Crustacea that has been searched for them.

"If we turn our attention to the internal structure of this antenna we shall find that it supports the idea of its being an auditory organ more forcibly than its external analysis. In the Brachyura, as before

observed, the first or basal articulation is largely developed: if it be removed from its connexion with the animal, and broken open, the basal articulation will be found occupied by a still smaller chamber, having calcareous walls of a much more delicate character than the integumentary structure. This internal chamber or cell is that which in this paper is supposed to be a cochlea, from its analogy, both in its structure and supposed use, to that organ in higher animals. It is situated in the cavity of the basal articulation of the antenna, and attached to the walls furthest from the median line of the crab. It presents a tendency to a spiral form, but passes not beyond the limits of a single convolution. The calcareous walls extend across the axis of the ideal spire, and the internal cavity is one continuous irregular chamber, the walls of which, at the centre of the axis, closely approximate so as almost to meet.

"This internal cell represents, we think, the cochlea of higher animals, to which it bears some resemblance, both in form and structure. If so, then beyond dispute it identifies the superior antenna as an organ of hearing.

"The internal structure of the inferior antenna differs very materially from the appearances we have just described. In the Brachyura, where the organs are most fully developed, there is attached to the operculum a long osseous tendon or lever, by which the attached muscles raise or close the entire organ, but there is no internal structure of any kind which could identify it as an organ of sound. The aqueous sac mentioned by Edwards I have entirely failed to discover.

"Viewing the two antennæ each as a whole, in their relative positions and connexion with the rest of the animal, we are forcibly led to the conviction that the upper antenna is an organ of hearing and the lower antenna is an organ of smell."

I am desirous of giving every publicity in my power to this ingenious hypothesis, diametrically opposed, though it be, to my own convictions on the subject.

Mr. Thompson's note on Nereis bilineata is as follows:—

"I beg to draw your attention to a fact I have not seen noticed in print. It is, that Nereis bilineata constructs a tube for its domicile. Its usual habitat is the upper coils of any dead whelk that may have been selected by a Pagurus for its domicile. This annelid is well known to the fishermen here, by whom it is much used as a killing bait for whiting. I was not aware of the fact of its constructing a tube for itself until lately, when, on breaking off the top coils, I found

that the worm had constructed a tube, with which it had lined its lodgings. The tube is perfectly white, rather strong, and not attached to the whelk shell."

Mr. Blackwall's new spiders are Ciniflo humilis and Nëriene affinis, both captured by Mr. R. H. Meade, the former in Buckinghamshire, in August, 1854, the latter in the vicinity of Burton-on-Trent, and also at Hornsea, on the east coast of Yorkshire.

'*Transactions of the Entomological Society of London.*' New Series, Vol. III., Parts IV. and V. London: Longmans. 1855.

Part IV. contains 48 pp. of 'Transactions,' 36 pp. of 'Proceedings,' and no plates; it is charged 3*s.*

The papers are intituled—

'Essay on the Genera and Species of British Formicidæ.' By Frederick Smith, Esq. (*concluded*).

'On the British Species of the Genus Stenus, with Notes on the Species of Stenus described by Kirby, and in the Illustrations of British Entomology, by Mr. Stephens; together with Observations upon the Specimens in Mr. Stephens' Collection.' By Messrs. G. R. Waterhouse and E. W. Janson.

'Descriptions of some Species of Brazilian Ants belonging to the Genera Pseudomyrma, Eciton and Myrmica (with Observations on their Economy by Mr. H. W. Bates.)' By Frederick Smith, Esq.

Mr. Smith's paper completes the Catalogue of the British Formicidæ, and will be particularly useful to the students of British Ants, more especially as it corrects some recently-made errors in the nomenclature of our species, for example:—

Myrmica scabrinodis of Nylander, Foerster and Smith = Myrmica rubra, *Curtis*, Trans. Linn. Soc, xxi. 213.

Myrmica ruginodis of Nylander, Foerster and Smith = Myrmica vagans, *Curtis*, Trans. Linn. Soc. xxi. 213.

Myrmica sulcinodis of Nylander and Smith = Myrmica perelegans, *Curtis*, Trans. Linn. Soc. xxi. 214.

This shows how necessary it is to keep pace with the progress of our science on the Continent, if we wish to establish (and who does not?) uniformity of nomenclature.

The paper on the genus Stenus is also of great value, and reflects great credit on the patience and perseverance of its authors.

In Mr. Smith's paper on Brazilian ants the observations on economy

by Mr. Bates are particularly valuable and interesting. Of Pseudomyrma oculata he says:—"Its colonies I have hitherto found only in the tumuli of different species of Termes: in some instances I found them in spacious elliptical chambers, in the outer walls of the Termitaria; one colony to each chamber; the chambers wide apart and having no connection with each other; the number of individuals few in each colony; the pupæ are not enclosed in cocoons. In some instances I have found them with their larva [larvæ] and pupæ within the same chambers as the Termes, in different parts of the Termitarium; the workers are sometimes found in numbers coursing rapidly over trees and herbage. Another species [of Pseudomyrma] constructs its Formicarium in the pith tube of dried twigs; the colonies are not numerous."

Part V. contains 48 pp. of 'Transactions,' 16 pp. of 'Proceedings,' and five plates, and is charged 5*s*.

The papers, in addition to the conclusion of Mr. Smith's Descriptions of Brazilian ants, are—

'Monograph of the Australian species of Chrysomela, Phyllocharis and allied Genera.' By J. S. Baly, Esq.

'Observations on the Honey Bee, in continuation of the Prize Essay of the Entomological Society for the year 1852.' By J. G. Desborough, Esq.

'Descriptions of some New Species of Lucanidæ.' By J. O. Westwood, F.L.S., &c.

Continuing our extracts from Mr. Bates' 'Observations on the Brazilian Formicidæ,' that indefatigable traveller observes of Eciton legionis, a new species:—"I have only found it in open, sandy and grassy campos; it shows the same irritability and hurried movement as the other species; is very quick to break line and to attack furiously any intruding obstacle. In a procession which I observed there were no individuals with the largely developed mandibles, as in other species. The locality in which I observed it being an open district, it afforded me an opportunity of observing some parts of its habits, and the business which occupies its immense processions; the columns of the other species I have always observed marching in the dense thorny thickets of the forest, so that the same facilities for observation do not offer themselves, and no human endurance can sustain the overwhelming attacks, the cruel sting and bite of these formidable insects. In this smaller species, although they climb by hundreds over one's person, in the same sudden way, the sting is not

at all formidable. The first time I met with this species it was near sunset; I found the column consisted of two trains of ants moving in opposite directions; one train empty-handed, the other laden with a variety of the mangled remains of insects, chiefly, however, the larvæ and pupæ of ants. I had no difficulty in tracing the line to the spot from which they were conveying their prey; this was in a low thicket; the Ecitons were moving rapidly about a heap of dead leaves: the tropical twilight was deepening, and I deferred further examination till the next day. On the following morning I found no trace of the ants in the place I had left them the preceding day, nor in the thicket were there any signs of insects of any description: but at the distance of eighty or one hundred yards I found them again, evidently engaged in another piece of business, a razzia of a similar kind, but requiring other resources of their instinct; they were eagerly occupied on the face of an inclined bank of light earth, excavating mines, whence, from the depth of eight or ten inches, they were extracting the bodies of a bulky species of Formica. It was curious to see them crowding round the orifices of the mines, and assisting their comrades to lift out the bodies of the Formicæ; the latter being too bulky for one Eciton to carry, it was torn into pieces, and the laden marauders forthwith started off with their booty. On excavating the earth about the mines, I found the Formicæ at the depth of about eight inches, also their larvæ and pupæ. As fast as I excavated the Ecitons rushed in, seizing the ants; I had great difficulty in securing a few specimens; they disputed them with me, even in my hands. In excavating their mines they assisted each other in so systematic a manner, with an appearance of so much intelligent cooperation, that it was truly a wonderful sight: those in the mines lifted up the pellets of earth to others stationed at the entrance, who forthwith conveyed them to a few inches distance from the place. I now turned towards the line of ants returning with their spoil of mutilated remains. For some distance there were many lines of them moving along the declivity of the bank, but at a short distance these converged; I then traced them to a large indurated and ancient Termitarium: up the ascent of this the Ecitons were moving in a dense column, like a stream of liquid metal; many were now assisting in lugging up the bodies of the Formicæ, and the whole disappeared in one of the spacious tubular cavities which always traverse these old Termitaria from the summit to the base."

We must make room for one more extract; it relates to Myrmica sævissima:—

"On the borders of the river Tapajos, this is the most dreaded ant, the terrible scourge of the river Tapajos. In 1852, I found, along the shores of the long sandy bays of the Tapajos, a continuous line of sediment, eight or ten miles in length, formed entirely of the bodies of the winged individuals of this species. It was the end of the rainy season, and the swarms had been carried away by the squalls of wind into the river, and had subsequently been cast ashore by the swell. This species is exclusively found on sandy soils, in open, semi-cultivated or neglected places: in the shade of the woods not an individual is to be found; careful cultivation and weeding expels them from limited spaces; they increase only in the neighbourhood of deserted houses, or unweeded plantations; consequently, they are a scourge only to the lazy and worthless people who inhabit the shores of this magnificent river. Sometimes they increase to such an extent that not an inch of ground is free from them; they dispute every fragment of food with the inhabitants; clothing they destroy for the sake of the starch, and attack persons with such cruel fury that the lords of the creation are obliged to beat a retreat, and the village becomes deserted. Their sting is very severe; the Brazilians compare it to the prick of a red-hot needle or point, hence the name 'Formiga de fogo.' Their Formicarium is subterranean, and in the village of Aveyros the unweeded streets are covered with their mounds: there are one or two on the floor of the church,—it is impossible, in fact, to avoid an attack. The 'Formiga de fogo' lets no one have any repose; one's legs are instantly covered with them, and they appear to attack in sheer malice. I was frequently obliged to retreat to the house of the Commandant, where it was my daily custom to enjoy an evening chat with the priest and a few neighbours; seated on chairs, with stools to support our feet, the ground being in full possession of the spiteful Myrmica sævissima."

Artificial Rearing of Salmon, and some of its Results.

ANOTHER most important point has just been established in regard to the history and habits of the salmon, in connexion with the very interesting experiments which have for nearly two years been carried on at Stormontfield. On Friday morning last, a beautiful grilse of 5½ lbs. weight was caught on one of the City of Perth's fishings at Darry Island, bearing perfectly indubitable evidence of being one of

the marked fish which were liberated from the Stormontfield Ponds in May and June last. Another specimen, we hear, was caught a week before at the foot of the Willowgate. In addition to these, we noticed, a fortnight ago, that a grilse was said to have been caught some days previously at the mouth of the Earn, similarly marked: the truth of this statement, as we remarked at the time, we have no reason to doubt, but the actual specimen itself not having been preserved, we did not feel warranted, upon the ground of it, to attempt to found any definite conclusions in regard to the various theories which have been so earnestly advocated upon this interesting and important subject. The specimen caught at Darry Island, however, having been preserved and sent to Mr. Buist's office, where it was exhibited during the day to hundreds of visitors, brings all controversy upon this branch of the subject irrefragably to an end. There can be no doubt whatever as to the genuineness of this specimen; the dead fin had been clean cut off,—the mode in which the smolts were marked on their liberation from the ponds,—and the abscission was completely cicatrized, and had evidently been so for some considerable time.*

That the full bearing of this interesting result may be more completely seen, we shall once more trace the progress of the experiment from the beginning.

In November and December, 1853, many thousands—as nearly as could be estimated 300,000—of ova were deposited in the boxes.

In April and May, 1854, the hatching took place. On the 15th of April, little fish were first observed at large in the troughs. We may remark, however, that in some more sheltered localities, where similar experiments were being carried on, at the same time, in a small way, by private gentlemen, the eggs were found, in one case, at least, to have been hatched in sixty days from the time they were deposited. In this instance they were laid under a stream of spring water just at its exit from the rock.

In June, 1854, the tiny inmates of the boxes, having generally attained the size of about an inch and a half in length, were introduced to the larger sphere of the pond, where, for twelve months, they were carefully tended and fed.

* In addition to the specimens referred to above, we saw on Tuesday, in Mr. Buist's office, another beautifully grown grilse of 5 lbs. weight, which had that morning been captured at Carthagena Bank, on the Seaside fishings, two miles below Errol, belonging to the Glover Incorporation of Perth. In the case of this fish, the dead fin was not only entirely cut off, but the scales had completely grown over the part which had been cut.

In May and June, 1855, a large proportion of the fry, having then reached the condition of smolts and manifesting the most undoubted evidences of the time of migration, having arrived, the sluice of the pond was removed, and free egress given to all the fish which might desire their liberty. During the latter part of May, and the earlier days of June, almost all the silvery-coated smolts had voluntarily left the pond, and drifting daily, in shoals of from 1000 to 10,000, into a temporary erection at the confluence of the conduit and the river, constructed for the convenience of marking, were, after suitable numbers had from time to time been marked, allowed ultimately to escape. About one in one hundred, we believe, was the proportion so marked. On May 29 a very much larger number than on any other day sought for the river, and a proportionally large quantity were of course marked.

And now, on Friday last, the 20th of July, after an absence of not more than two months, we have the perfectly indisputable result of one at least of those smolts, so shortly liberated, having returned from the sea a beautiful and well-grown grilse of $5\frac{1}{2}$ lbs. weight.

The very largest of the smolts which left the ponds in May and June measured only about 7 inches in length, and weighed from $\frac{1}{2}$ to 1 oz. The grilse caught on Friday measures $24\frac{5}{8}$ inches in length, and $12\frac{1}{2}$ inches in circumference, weighing, as we have said, $5\frac{1}{2}$ lbs. That the comparative sizes of the same fish at the two stages of its growth may be more easily and accurately apprehended, a very beautifully executed photograph has been taken by Mr. Cumming,—now practising that wonderful art in this place,—for the purpose of being printed, of the marked grilse caught on Friday, along with a preserved specimen of the largest size of the smolts as they were liberated in May and June.

Thus is one more perfectly irrefragable proof afforded of the fact, which for some time, indeed, has been satisfactorily enough established, that the young of the salmon which migrate to the sea in the earlier part of the season as smolts, return in the later part of the same season as grilses. This is the first occasion, we suppose, of the fact having been publicly demonstrated in the Tay: but in other rivers it had been clearly proved years ago. In a very interesting and valuable work on the 'Natural History and Habits of the Salmon,' by Mr. Andrew Young, of Invershin, superintendent of the Duke of Sutherland's extensive fishings, we find the following stated as the result of that gentleman's repeated experiments in regard to this point:—

"I marked," says Mr. Young, "a number of smolts on their way to the sea, and continued this process for several summers, but yearly changed the mark from one part of the fish to another. This marking was done particularly for the purpose of ascertaining the exact time that the smolt was absent from the river until it returned a grilse; because it was the opinion of some, and some even assert it yet, that smolts are a whole year in the sea before their return; but if they were a year they must be more—they must have been *fourteen months.* However, without marking them at all, we are certain that salmon in no stage of their migrations remain that time absent from the rivers. What I marked was in April and May, and in course of June and July following we caught several of them with the same marks, grilses varying from three to eight pounds, but did not catch in the following year a grilse with the smolt-mark of the previous year. And, although I continued marking and searching for them on their return, the result was invariably the same. And, from these experiments and the length of time the marked smolts were absent, I am of the decided opinion that the great majority of them remain away only about two months."

But the duration of the smolts' absence at the sea before returning as grilses is not the point which has been principally debated in this locality. Our controversy has been chiefly upon a point far antecedent to this. Our readers will remember, that after having successfully reared some 200,000 or 300,000 young fish, it was, in the early part of May last, keenly discussed—what we were to make of them; whether they were to be allowed, at the end of the first year, after hatching, to seek their way to the sea; or whether they should be detained in the ponds until the end of the second. Upon this point the authorities were quite at variance. Mr. Wilson, of Edinburgh, and Mr. Shaw, of Drumlanrig, after visiting the ponds, pronounced for a two years' nursing, while Mr. Young, of Invershin, who had never seen them, but, basing his opinion upon the result of his own experience elsewhere, was equally decided in favour of only one. The balance of authority seemed to be against Mr. Young, and at one time, we believe, it was resolved to confine the whole stock till May next year. A week or two's further experience and observation, however, speedily turned the scale against the two-year theory. The rapid growth of the fry, the large proportion which immediately progressed into indisputable smolts, and the striking evidences which the larger inhabitants of the ponds themselves clearly manifested that the time of migration had

really arrived, led to the wiser resolution of the committee, that the more advanced and matured of their charge should be allowed to follow the dictates of their nature. The result has proved the wisdom of this resolution. To have confined the whole fish would certainly not have proved that salmon fry remain two years in the river before going to the sea; while, by the course which has been adopted, it has been proved that the larger part of them remain in the river only one year. We cordially congratulate all the gentlemen concerned upon this highly satisfactory and gratifying result of their experiment; and we trust we shall speedily have to congratulate those gentlemen more immediately interested, perhaps, in the success of this scheme for increasing the produce of the river, upon a very abundant grilse season.

But, while several points in regard to the natural history of the salmon have been thus clearly and most satisfactorily determined, one very interesting question is still pending at Stormontfield. While all the ova were deposited in November and December, 1853, and all the hatching was completed in April and May, 1854, only about two-thirds of the fry had attained the migratory stage in May and June, 1855. One-third of the original stock are still in the pond, and, although the sluice has never been closed since it was first opened in May, they manifest no desire whatever to leave it. In point of fact, with perfectly free means of egress, not one of them has left the pond since the general migration ceased at the 7th of June last. Thus, while one portion of the same hatching are being captured in the river, beautifully grown grilses of 24 inches in length, another portion is still enjoying the shelter of the pond, tiny creatures, none of them more than three or four inches long. The result of this striking feature in the experiment will be watched with much interest. It may be, that, while Mr. Young was right in holding that smolts migrated to the sea at the end of the first year after hatching, and his opponents were wrong in maintaining that they only migrated at the end of the second, they, too, were so far right, should it be found, notwithstanding the migration of a portion at the end of the first year, that a portion also remains over the second.

We can only remark now, in regard to the sexual question raised in connexion with this subject, that nothing whatever has as yet been established in regard to it at Stormontfield, further than that the grilse taken on Friday was a female, and that on Tuesday a male; and that any observations that have been made on the small fish give reason

to conclude that there are both male and female now in the ponds.—*Perthshire Courier, July* 26, 1855.*

Memorandum on Dr. Knox's papers in the last 'Zoologist.'—Two notes were appended to Dr. Knox's papers in the last number as the proofs passed through that gentleman's hands. Both entirely escaped me until my attention was called to them by correspondents. The first is at p. 4778, and relates to the supposed death of M. Valenciennes. I have reason to hope that distinguished zoologist is still living and in good health. The second is at p. 4798, and relates to myself: the conversation to which the Doctor refers related to the experiments so often recorded of keeping tadpoles in the dark, and thus prolonging their tadpole existence.—*Edward Newman.*

Occurrence of the Spined Loach (Botia tænia) *near Dorking.*—I took this pretty little fish about a fortnight ago in a little muddy stream that runs into the Mole just below the Bridge at Brockham Lodge, the residence of my friend William Bennett, whose hospitality I was enjoying. I was fishing for Hydradephaga, and, on seeing the little creatures wriggling at the bottom of the net, I supposed the first and second haul to be juvenile beardies, and threw them in accordingly; but the uniformity of size at last struck me, and this, inducing a closer inspection, *oculis armatis*, *i.e.* having put on my specs, I found myself possessed of a fish whose personal acquaintance I had not previously made. Mr. Yarrell says it is called "the groundling;" but I certainly can scarcely suppose that it is known as distinct from the beardie by any of those who apply English names, and I would rather believe that the terms loach, stone loach, beardie and groundling apply equally to the larger species. There is nothing by which this fish is likely to be distinguished from the beardie, unless by the instructed eye of science, which imparts an interest and a value to all that it beholds. It occurred in coarse grass floating over a muddy bottom at the very edge of the stream, and the habitat did not extend above half a dozen yards. I may here remark that the undulating outline of the back, which gives so marked a character to Mr. Yarrell's figure, was wholly unobservable in the living fish; and as this character is not mentioned, I believe it possible that it may be due to the process of preserving, through which the little fellow had doubtless passed before sitting to the artist who has immortalized him in the 'British Fishes.'—*Edward Newman.*

The Snake and Child Exhibition.—The Child Bitten Repeatedly, and the Father Arrested.—Several hundred people visited Cochituate Hall yesterday afternoon, to witness, it is hoped, the last exhibition of what have been falsely termed the "charmed snake and child." Our readers may be assured that there is no "charming" or "fascination" whatever connected with the show; but, on the contrary, the whole affair is a gross attempt to deceive the public at the expense of merciless torture to a little girl of tender years, who has been so often bitten by the reptile that the cruel and disgusting exhibition is likely to be stopped. Yesterday afternoon the father was taken into custody on complaint of Dr. I. W. Ayer, reporter for the Chronicle.—*Evening Transcript, July* 26, 1855.

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* Obligingly communicated by William Yarrell, Esq.

Contributions to the Philosophy of Zoology. By R. Knox, M.D., F.R.S.E., &c.

Part I.—*On the Relation of Species or Race to Genus or Natural Family: a Question of Transcendental Anatomy.*

INTRODUCTION.

Zoology, to be esteemed a Science, must be based on philosophical principles. True, it is a science of observation and not of calculation; it has to deal with living bodies, and with the mysterious and hitherto undiscovered principle of life, whose laws are not to be explained by numbers, however multiplied, nor by a geometry, however refined. Fluxions avail not here, nor the integral calculus. Nevertheless, some great minds have shown that Zoology has its laws, which, despite difficulties almost innumerable, may be so inquired into as to evolve some truths of more import to man than at first appears.

The observation of nature is no doubt the first duty of every candid observer; next comes the duty of the inquirer into her laws, for the mere observance of a fact is of no value whatever, unless that fact be placed in its relations with all others. Men had observed, and no doubt observed carefully, long before the age of Aristotle, but he alone was equal to the production of the 'Historia Animalium.' He was followed, at a long interval, by Buffon and Linné; last came the immortal Cuvier. The discovery of the true signification of the fossil remains of the organic world by this illustrious and justly celebrated man, was unquestionably the most remarkable step ever made for the advancement of the human mind. The element of research he employed was the descriptive anatomy of the adult or fully-developed individual of all, or at least of most, of the species of animals now occupying the globe. The minute descriptive anatomy of the species, with a view to the rigorous determination of its true nature and position in a natural-history arrangement, seemed to be the ultimatum of all his inquiries; and if he spoke of genera or natural families it was more as a naturalist, or as one by whom generic distinctions were viewed rather as expressions of philosophic arrangement than as realities based in Nature. It was whilst pursuing this inquiry into the existing and living Fauna of the present world that the thought struck him of applying the element of research he then wielded with such dexterity

to the fossil remains of a former world; never since man studied science had a thought so fruitful in great results entered the human mind. By it he dissected, as it were, the globe itself, giving to the lovers of truth in science a key wherewith to read those vestiges of successive animal forms which we, for want of a more correct term, call Vestiges of Creation, and removed from the mental vision of men that dark veil of ignorance which had certainly endured for some thousand years.

As Cuvier pursued his anatomical investigations, for they were strictly so, he classified and arranged the individual animals examined by him into distinct species, according to their anatomical differences; still, adhering to the anatomical method, he only viewed the distinctions as generic when they were wider, larger and quite apparent. Not that he despised external characters, or neglected them; but as an anatomist he felt himself bound to view them as secondary and of infinitely less importance than the anatomical. Moreover, they were wholly inapplicable, or nearly so, to the fossil world, at least to that class, the Vertebrata, in which man is most interested.

If the theory I am about to propose be true, that the young, namely, of every species, represents a *generic animal*, embracing in its structure and natural-history characters the *possible* of all the species, past, present and to come, belonging to the natural family of which it forms a portion, then the natural history of the fossil world might be guessed—might be restored, but not otherwise. The fossil horse was only a horse *generically;* but whether a horse properly so called, an ass, a zebra, a quagga, or none of these, none can now for certain say: the fossil tiger was no tiger, in all probability; nor the bear a bear, appertaining to, or to be classed with, any species now living. The exterior of the fossil world is lost for ever; all that is left of it being merely the fabulous traditions of rude ages, peopling the world with monsters, which the discoveries of Cuvier in some measure corroborated.

When the anatomical method failed in Cuvier's hands, as it often did, the illustrious discoverer was thrown upon the field of hypothesis. The seeming fixity of species was the first stumbling-block he encountered; this led to his theory of successive creations, if that can be called a theory which removes the inquiry at once from all further investigation. By anatomy it was not easy, occasionally impossible, to distinguish species from each other, which, when viewed as clothed with their external attributes, are obviously and notoriously distinct. In this predicament stood the lion and tiger, panther and leopard,

horse, zebra, ass, dog, wolf, fox, jackall, pig, ox, man. The theory of variety, to a certain extent permanent, was next brought to bear on these difficult questions; the influence of domesticity was also invoked, and even the fruitfulness of hybrid races was asserted; so that Natural History fast retrograded towards the silly hypothesis ascribed to Aristotle, who is supposed to have conjectured that the vast variety of animal forms with which Africa abounds is due to the arid nature of the country and its paucity of rivers and springs, thus bringing together animals of many species and genera; hence the varied character of Afric's Fauna.

The inadequacy of anatomy to distinguish species in every case was fully admitted by Cuvier himself. I also admit this practically, but with this reservation, that the minute anatomy of even the osteology of every species differs in a certain degree, however slight, from every other; but such minute differences are not of much importance in the establishment of important principles, nor can they always be depended on. The nasal bones of the horse and ass differ in form from each other, more perhaps than any part of their respective osteology; but how insignificant is this difference, in a natural-history point of view, when compared with those external characters which mark the zebra, the horse, the ass, and quagga! The same remarks apply to the lion and tiger, in respect of these very bones, the nasal, and their relations to the superior maxillary bones; to the white ox of Scotland and to the common domestic ox. The nasal bones, the skeleton of the head, the character of the teeth, do not differ more regularly or constantly, nor to the same extent, in the horse, zebra and ass than they do in the races of man. The skeleton of the head of the Negro and Bosjesman differ much more widely from the white races of man than those of the horse and lion differ from the corresponding structures in the tiger and zebra. I do not, therefore, admit, to the full extent, that anatomical characters ever fail to discriminate species; but I freely admit their occasional inadequacy to characterise or to lead to the determination of species in a practical sense. On the other hand, the facility with which this may be done, by a consideration of the external characters, is known to all the world. Science admits of no exaggeration; Anatomy has done much for Natural History; much for Philosophy; still more for humanity, by purging the human mind of deep-rooted errors, of a gross and scandalous character, of forty centuries' growth. But Anatomy has its limits, notwithstanding, and these limits were admitted and defined by the Great Master himself.

It was not to be expected that a mine of knowledge such as was discovered and first worked by the great Cuvier should continue to be explored by so many vigorous hands, and that all should go smoothly with the labourers: difficulties soon appeared, and they increased so rapidly in number and in strength as to cloud with anxiety for the fate of his great discovery the mind of the immortal author of the 'Ossemens Fossiles.' It seemed as if he were about to survive his own vast reputation. So seemingly unimportant a question as the influence of domestication over animal life embarrassed the great anatomist. The anatomical element of inquiry having failed in establishing specific distinctions in the various oxen which ornament the cultivated earth, Cuvier was forced to imagine them to be like the dog, of one species; Goethe, the transcendentalist, starting from a higher point of view, had arrived at the same conclusion. "The infinite varieties of the domestic ox," observed the sublime author of 'Faust,' "are simply the gift to man of domesticity acting through millions of years." Such also was Cuvier's opinion, omitting the "millions of years." What his real opinions were on the influence of time and circumstances he never, so far as I know, communicated to any one. The monumental records of Egypt, depicting man then as he is now, after the lapse of at least 4000 years, were perfectly well known to him. Still greater difficulties he prudently passed by without a passing notice. And yet his great discovery laid the foundation of Geology, Palæontology, and a true history of life on the globe. Before him these sciences could not be said to exist.

Prior to this eventful scientific era the German school of philosophic anatomists had made an advance towards the same object, but from a different point of view. Anatomy was still the element of research which they employed, but it was the Anatomy of the embryo. At the head of this school was the justly-celebrated Goethe, poet, philosopher, naturalist, mathematician; his genius seemed universal. He it was who first distinctly formuled the law of unity of the organization in all that lives or has lived. The doctrine of "arrest of development" came soon after into vogue, chiefly through Meckel and the German schools of anatomists,—a doctrine based on a superficial and a somewhat incorrect application of facts, curious and important in themselves; to this at last were added the Teratologie of Etienne Geoffroy (St. Hilaire) and the serial unity of De Blainville.

Believing the transcendental in Anatomy to be the only instrument of research at present known by which a correct basis can be laid for the philosophy of Zoology, I have never ceased to study and teach it

since the period (1811) when it first became known to me. To the writings of Vicq. d'Azyr I am indebted for the first hints of its existence. Biassed in favour of descriptive anatomy, I have ever objected to the too hasty adoption of extreme transcendental views, holding it to be a true maxim in science, as well as in social life, that the change or step in advance, in order to be certain and trustworthy, must ever be made with caution, and, if possible, supported by the demonstration of physical materials; or, in other words, the thought which genius submits to the world as an idea must become a physical demonstration before the world can fairly be called on to admit its truth. This is the view I take in the following Memoirs, in some of which it is my intention to apply the transcendental to Natural History as a preliminary to my inquiry into the natural history of man. The true relation of species or race to genus or natural family seemed to me to present a favourable mode of testing the value of the transcendental, not with any idea of testing its truth,—that has been settled long ago,—but of ascertaining its practical value as an instrument of research. The true relation of race to natural family being first discovered, it will then be time enough to apply the transcendental to the relation presumed to subsist between natural families, and, lastly, between these and the universal primæval life of the organic world of this globe.

In selecting the natural family of the Salmonidæ as a subject of research I have been guided by several considerations: I had already made them the subject of extended research, and their external characters offered favourable points of view for such an inquiry. It is chiefly to the exterior that I give my attention in the present Memoirs; the interior will follow. I commenced with the dentition, that natural-history character to which all, whether naturalists or anatomists, ascribe such importance; next followed a brief inquiry into the systems of coloration and proportion. To all these the transcendental applies, or ought to apply, if true. That it is true as a theory I have not a doubt myself, however I may fail in proving it to the satisfaction of others. My immediate object is to prove the existence of a *generic animal*, the product, no doubt, of hereditary descent from a species, but in itself including the characteristics of all the species belonging to that natural family; or, in other terms, proving hereditary descent to have a relation primarily to genus or natural family. By this term I endeavour to explain family likenesses commingling with the generic; the more or less resemblance, for example, of an individual with other affiliated races, to none of

which it belongs by strict hereditary descent. My ultimate aim is to offer a scientific explanation of the appearance, from time to time, of seemingly new species on the earth, and of the extinction of others, thus restoring to legitimate science that branch of philosophy which the theory of successive creations, invented by Cuvier and still maintained by his followers, had clearly removed from it. To prove the unity of the organization, the unity of creation, and the serial unity of all that lives or has ever lived, forms the aim of the first part of this inquiry.

R. Knox.

Meissen House, Upper Clapton,
September, 1855.

Entomological Botany (*with more especial reference to the Plants frequented by the Tineina*). By H. T. Stainton, Esq.

(Continued from page 4777).

Lotus major. Greater Bird's-foot Trefoil.

It is probable that most of the species which feed upon L. corniculatus feed also on this plant; at any rate, the Nepticula (still not bred) does, as I found several of it in Headley Lane last month.

Astragalus Glycyphyllos. Sweet Milk Vetch; Wild Liquorice.

Speyer enumerates as feeding on this, Lycæna Cyllarus, Anthrocera Achilleæ, A. Hippocrepidis and A. Onobrychis, all species unknown to us as British, though it is extremely likely that we have yet to find more than one species of Anthrocera. Toxocampa lusoria, not yet detected in this country, feeds on this plant in May. Two species of Coleophora feed on this plant, neither of which has been found in this country, because neither has been looked for: they are C. Coronillæ and C. serenella. The former is most plentiful in August; it has a rather long case, without lappets; it eats again a little in May. C. serenella, whose personal acquaintance I made at Glogau and Stettin, where it seems to occur almost wherever the plant grows, feeds in September and again plentifully in May; the case is short, white and very broad, reminding one of a short lady with numerous flounces. This was the insect to which Réaumur gave the name of Teigne à

falbalas. The mined places on the Astragalus leaves are of a pearly white and very conspicuous.

Vicia sylvatica. Wood Vetch.

An elegant climbing plant, most frequent in mountainous districts. It is fed upon by Psyche viciella and Toxocampa Viciæ, according to Speyer; but Guenée gives Vicia dumetorum, which is not a British plant, as the food of the last-named species.

Vicia Cracca. Tufted Vetch.

A plant which from its long tufts of deep blue flowers early attracts our attention. It delights to grow in hedges and bushy places, and is often mercilessly stripped of its blossoms by the young botanist, who deems, on finding it, he has got a prize. This is the principal food-plant of Toxocampa pastinum, of which the larva feeds in May. Speyer also cites as feeding on it, Gnophos obfuscaria. No Tineina larva has hitherto been observed upon it.

Vicia Sepium. Bush Vetch.

Abundant in lanes and borders of woods, and one of the first of the genus which greets us in the spring with its dark purplish flowers. Speyer gives as feeding on this Ptychopoda remutata. Two years ago a Tortrix? larva was observed on this plant, and also on Lathyrus pratensis, feeding in September and October, between two united leaflets, of which it devours the inner epidermis: these larvæ, though not uncommon, all perished in the winter, and we are unaware to what species they should be referred. This plant is, however, most notorious for being the favourite food-plant of the lovely Lithocolletis Bremiella. This species, according to Professor Frey, of Zurich, frequents those plants which grow in shady borders of woods, mining the *under side* of the leaf; the larva appearing in July and again in September and October.

Pisum. Pea.

Speyer mentions as feeding on this, Calocampa vetusta and C. exoleta, Mamestra Pisi, Noctua brunnea and Endopisa nebritana. I am not aware of any Tineina larvæ attached to it whilst in a growing state, though dry peas are eaten very readily by Endrosis fenestrella and Œcophora pseudo-spretella.

Lathyrus pratensis. Meadow Vetchling.

Speyer gives as feeding on this plant, which is very common with us in meadows and hedges, two species not known as British, Orgyia selenitica and Fidonia glarearia. The Tortrix larva, already mentioned under Vicia Sepium, feeds on this plant in September and October; and a Coleophora larva has been observed on this plant (according to Tischer), but there is some doubt to which species it should be referred.

Orobus niger. Black Bitter Vetch.

A very scarce British plant, yet cited by Speyer, on Tischer's authority, as the especial food of Ephippiphora Loderana. It *may*, however, feed on other and commoner species of the same genus.

Ornithopus perpusillus. Bird's-foot.

Common on dry sandy and gravelly heaths, but easily overlooked from its prostrate habit. Speyer mentions as feeding on it Anthrocera fausta and Eyprepia Hebe, but the larva of the latter appears quite polyphagous. It is hardly necessary to add that neither of these species is known as British.

Hippocrepis comosa. Horse-shoe Vetch.

Common in chalky places, but probably confounded by the uninitiated with Lotus corniculatus, which it much resembles; the leaves, however, are pinnate instead of trefoil-form, and thus it may be immediately distinguished. Hübner represents the larva of Polyommatus Corydon as feeding on this plant, and it is on it that I am disposed to think that the larva of Coleophora niveicostella will be found to feed.

Persica vulgaris. Peach.

Speyer mentions as feeding on this, Papilio Podalirius, Anthophila communimacula (a species not alluded to in Guenée's Noctuelites), Tortrix cerasana and Cerostoma persicella. Tortrix cerasana, as we know very well, is tolerably polyphagous; but no other food-plant has yet been assigned to Cerostoma persicella, which may some day put in its claim to be naturalized amongst us, as many another insect of extraneous origin has already done. The larva of Anarsia lineatella, figured in Fischer-von-Röslerstamm, plate 94, feeds on the young shoots of the peach in early spring, boring down the stem of the shoot and causing the terminal leaves to droop. It is very injurious to the

plants it attacks, and is much dreaded by the gardeners of Vienna and Berlin. It has not yet been found in this country, but as, according to Fischer, it has occurred on the plum-tree, and indeed Fischer suspects it also feeds on sloe, the chances of our finding it here are very considerable.

Prunus domestica. Plum.

Speyer enumerates the following species as feeding on this plant:—*Papilio Podalirius*, Pieris Cratægi, Thecla Pruni, T. Betulæ, Trochilium culiciforme, Liparis dispar, Porthesia chrysorrhæa, P. auriflua, Orgyia gonostigma, O. antiqua, Eriogaster lanestris, Clisiocampa neustria, *Gastropacha Pruni*, Acronycta tridens, A. Psi, A. Rumicis, Orthosia instabilis, O. stabilis, O. munda, Amphipyra pyramidea, *Miselia culta*, M. Oxyacanthæ, Xylina rhizolitha, X. petrificata, *Catocala paranympha*, Ennomos alniaria, E. lunaria, E. illunaria, E. illustraria, Ourapteryx sambucaria, Rumia cratægata, Angerona prunaria, Chlorochroma vernaria, Hibernia leucophæaria, H. defoliaria, Boarmia rhomboidaria, Tephrosia crepuscularia, Biston betularia, B. hirtaria, B. prodromaria, Coremia fluctuata, Eupithecia rectangulata, *Tortrix diversana*, T. cratægana, Penthina prunina, P. variegana, Carpocapsa Wæberiana, C. pomonana, Exapate gelatella, Cerostoma scabrella, C. asperella, Swammerdamia pyrella, Coleophora anatipennella; he also mentions Pterophorus pentadactylus, which we know feeds only on Convolvulus; and this capital error shows with what caution all the preceding statements must be received. In the foregoing list the species not yet detected in this country are designated by Italics.

The most important plum-feeder that we know is Opadia funebrana, the larva of which feeds in the inside of the fruit of the plum. All eaters of plum-pie must have observed that some plums have the stone embedded in a layer of little brown grains, which are in fact the "frass" of this larva, though when we see this "frass" in a boiled state and swimming in juice, unless we are entomological enough to know what it is, it eats very well.

"What the eye don't see, the heart don't feel."

Strange that an insect so common that we see it by dozens in our plates is so seldom met with by entomologists that it is to be found in very few collections!—but the habit of the perfect insect is very retired, and when sitting on the stem of the plum-tree, from its uniform dingy colour, it is not very easily recognized.

Nepticula plagicolella, though most at home on the sloe, mines the leaves of the plum also very readily; and it is probable that many other sloe-feeders will be found also to occur on the plum.

H. T. Stainton.

Mountsfield, Lewisham,
September 8, 1855.

Synonymic List of the British Carnivorous Water Beetles, together with Critical Remarks, and Notices of Foreign Allied Species.
By the Rev. Hamlet Clark, M.A.

Any one who takes the trouble to compare our lists of British Hydrocantharidæ and Philhydrida with those of other European countries, as Austria, France, Sweden, comes at once to the conclusion that we cannot compete with them; ours are manifestly inferior; we can boast neither of the same number nor the same variety of species. Why is this? How is it that, in the genus Hydroporus, Schaum's excellent list of our native species gives but forty-two, while Fairmaire, representing France, can bring forward his sixty-six species? It must proceed from one of two causes; either our islands are comparatively unproductive, or our field naturalists have been inattentive. And yet, with regard to the former, if we may argue from analogy and from other departments of Nature, Britain is not so entirely barren; our Flora is certainly creditable; our lists of birds are respectable; fishes, and mollusks and Echinodermata frequent our shores, and Diatomaceæ and Desmidiæ our peat districts, at least in proportion to those of our neighbours; nay, even as to insect life, we discover—thanks to the energy of some among us—that in Micro-Lepidoptera we are considered preeminent: can it be that in Coleoptera alone, and especially in those groups of the order which are protected by their habitats from many of the vicissitudes and accidents of ordinary beetle-life, and live and die in their native waters from generation to generation undisturbed, we are so inferior? I for one am convinced that it is not so; and that our confessed inferiority proceeds simply from the absence of investigation. I remember of course the small geographical area of Great Britain compared with the extent of other countries with their richer Faunas, but I can find in this no sufficient explanation. We have in the Western Islands and Orkneys our Lapland and Sweden; in Perthshire

and the Highlands our Alps; in the southern coasts of England and Ireland our France and Germany: in short, by our natural variety of soil and climate, we have, and in approximating latitudes, many of the peculiar physical characteristics of other countries.

That investigation may be quickened among us, and that these unknown but interesting groups may receive increased attention, I have, in as few words as possible, described other species, found on the Continent, but at present unrepresented here: I might have extended them numerically, but have introduced (in parentheses and without numerals) *those only which I believe may probably be found in this country:* the capture of *four or five* additional species, without any corresponding effort, during the past year, will show that this anticipation is not absolutely chimerical.

It will be understood, then, that this catalogue does not profess to be accurate; rather, that it professes to be inaccurate; that it is merely approximating and suggestive; and that criticism, species by species, amendments and corrections, will be welcome proof of its value.

I have assumed that it will fall into the hands chiefly of those who have some knowledge of our present British species; I have not therefore described these, and others only relatively by their approximating and distinctive characteristics: in the hope, however, that others may be led to take up the study of these groups, I will add a few suggestions as to practical collecting. The apparatus is simple; a couple of well-corked, wide-mouthed phials, containing bruised laurel leaves or a few drops of chloroform on blotting-paper; a water-net of cheese-cloth on a steel hoop of 16 or 18 inches diameter, with joints so as to fold up in the pocket; an oil-skin bag as a cover; and a walking-stick with ferrule, to which the net is screwed, is all that is necessary.

And as to the localities to be visited—ditches in which are clumps of Sphagnum, or tangled masses of any water-plants; any place, in fact, that affords shelter will be sure to afford insects. I have taken, in Norfolk, a dozen specimens of Colymbetes Grapii at one dip, by securing a handful of hay floating on the top of the water; and in a lake in Scotland I was only successful in taking species by sinking in the water little bundles of grass and heather, and examining them day by day. Water-plants of all kinds, and especially those at the *ends* of ditches, will repay examination: on the moors and mountains species are found in abundance, not only in pools, but in little bits of marsh, where the net must be scraped along the ground in order to get up any water; rivulets and pebbly brooks have their

peculiar representatives that frequent not aquatic plants, but the margins of pebbles; species of the genera Elmis and Hydræna may often be taken by removing with the hand stones from the bottom of brooks, and examining their under-surface; while muddy banks are tenanted by Heteroceri and some species of Cercyon. Although, however, these are the most productive localities, it is often advantageous to search those that *appear the most unproductive.* I have taken good Hydropori in a horse-tank: when adjoining ditches, promising in appearance, were barren, recently-flooded grass fields have produced insects not to be met with under usual circumstances; and I recollect that I first captured Hydrop. geminus, in the utmost profusion, in the filthy mud of one of the Huntingdonshire Fen lodes, when nothing whatever was to be found in the ordinary localities.

With reference to the important subject of the due preparation of specimens when taken for the cabinet, I cannot do better than refer your readers, especially such as are commencing the study, to the capital remarks of my friend Mr. Wollaston, in the second edition of Mr. Stainton's 'Entomologist's Annual' for this year. If the collector has but little time for arranging smaller specimens, during his entomological excursions, I recommend Mr. Wollaston's plan of setting out promiscuously the choicest examples on large pieces of framed card-board, to be cut out, pinned and arranged hereafter at leisure; this plan, however, requires *ample time* and *abundant leisure:* to those who can command less time for future setting out I should recommend the plan, which I as frequently adopt, of having in the travelling-case small oblong cards, of two or three sizes, neatly cut, which may receive at once single or pairs of specimens, and which, *without any further preparation* of cutting or pinning, are ready to be catalogued forthwith, and forwarded to entomological friends, or consigned to the cabinet. Both plans are good, and the adoption of either will produce a neat, well-disposed collection. I shall have pleasure in sending to any Coleopterist some of my cards, which are printed on one side with a copper-plate, for the purpose of being more accurately cut.

With regard to the season for collecting; in opposition to the requirements of other insect-life, all months are more or less productive. June is the height of the season; but owing to the protection which these families have from extremes of temperature, no month is without its representatives. I have taken many species *from under the ice,* and indeed the scarce species, Hydrop. oblongus, *Steph.*, and Agabus striolatus, *Gyll.*, and probably others, are to be taken freely *only* in

the months of February and March. Many of us have forgotten that these insects are far better protected against the rigours of frost than we are; and so, by following the old-fashioned custom of collecting only when the sun shines, we fail to obtain probably many species which are now either of the rarest, or altogether unknown.

So far as we know, there is but one of our native species that is eminently *nocturnal* in its habits—Orectochilus villosus.

I have been making, during the summer, some experiments as to the practicability of keeping these insects in vivariums; and have succeeded, at least so far as to be able to recommend the subject to any who would desire to enter upon an untrodden field of research, or even to those who would view vivariums merely as interesting subjects for their drawing-room windows.

I believe that a careful study of these groups *when alive*, and when subject only to conditions which affect their natural state, will reveal to us very much of their habits, of which we are now so confessedly ignorant: we know nothing of the period of their larva and pupa states, of their metamorphoses, of their distinctive specific habits; nay, we are unable to recognize the insect at all as a pupa or larva.

All this and much more has to be learned; and all this and much more may readily be discovered by any who will give a little patient attention to the subject of vivaria. I have no doubt whatever that it is within the power of almost any one of your readers to throw much light upon these very interesting questions; and this, not by devoting himself entirely to the study, but as an amusement, by merely attending to the natural requirements of the species, keeping up a proportionate supply of vegetable life, spending a few minutes *de die in diem* in watching them, and carefully recording on paper, which should always lie near the vivarium, whatever he sees with his eyes.

I have throughout the following catalogue noted the size of each species in French millimetres; I have done so because, in the absence of specimens, I found it very difficult to give their exact value *in lines* without either producing unwieldy fractions, or deviating from strict accuracy; I have hence followed the Continental system of measurement.

Genus Dytiscus.

(D. latissimus, *Linn.*, *Fab.*, *Oliv.* Long. 40; larg. 25. The largest of the genus, known at once by its largely-dilated elytra; not uncommon in northern countries of Europe. Rare in France.)

1. D. circumcinctus, *Ahrens, Gyll., Steph., Sturm.* ♀ *elytris sulcatis,* D. dubius, *Gyll., Aubé.* D. angustatus, *Steph.* Long. 30—33; larg. 15—17. Whittlesea Mere; near Cambridge.

2. D. marginalis, *Linn.* D. submarginalis, *Steph.* ♀ *elytris lævibus,* D. conformis, *Kunz., Steph., Aubé.* Common everywhere.

3. D. circumflexus, *Fab.* ♀ *elytris sulcatis,* D. perplexus, *Aubé.* Near London; Mr. Newman has taken it at Peckham.

4. D. lapponicus, *Gyll., Germ., Zetterst.* D. septentrionalis, *Gyll.* Long. 25—28; larg. 14—15. Pitchy brown, beneath testaceous, margins of thorax and sides of elytra bordered with yellow, along the elytra are 18 or 20 faint luteous lines: may readily be distinguished by its smaller size, and the frequent luteous lines on elytra. I took this insect in the Isle of Mull, September, 1854.

5. D. punctulatus, *Fab., Steph.*, &c. Common.

6. D. dimidiatus, *Bergst., Steph.* Not so common as D. punctulatus, but generally distributed.

Genus Cybister.

1. C. Roeselii, *Fab.* Long. 30—33; larg. 16—18. Certainly rare in England; Stephens notices a specimen taken at end of September, 1826, at Walton, in Essex; also near Colchester, *Steph. Man.* Dr. Power informs me that it has been taken at Southchurch.

Genus Pælobius.

1. P. Hermanni.

Genus Acilius.

1. A. sulcatus, *Linn.* A. scoticus, *Steph. Ill.*

2. A. fasciatus, *Degeer, Erich., Steph. Man.* A. canaliculatus, *Nicol., Steph., Aubé.* A. caliginosus, *Curtis.* A. sulcipennis, *Sahlb.* A. dispar, *Zieg.* Not so abundant as A. sulcatus. Whittlesea Mere; near Edinburgh.

Genus Hydaticus.

1. H. stagnalis, *Fab., Gyll., Steph.*, &c. Long. 14; larg. $7\frac{1}{2}$. The introduction of this species to our lists rests upon two specimens, one taken by Dr. Leach "in a pond near Exeter," the other by the Rev. F. W. Hope "in a pond at Netley."

(H. austriacus, *Dej., Sturm.* Long. $12\frac{1}{2}$—13; larg. $7\frac{1}{2}$—$7\frac{3}{4}$. Closely allied to H. cinereus; it is however somewhat smaller and more oval;

sides of thorax not so rounded; the yellow transverse band of the thorax narrower. France, Austria; probably in other northern countries of Europe.)

2. H. cinereus, *Payk.*, *Gyll.*, *Curt.*, *Steph.* Long. 14—15; larg. 8—8½. By no means common. Cambridge and Huntingdon Fens.

(H. bilineatus, *Deg.*, *Payk.* Long. 15; larg. 9—9½. Closely allied to H. cinereus; to be distinguished by flatter body, and by broader band on thorax. North of Europe.)

(H. zonatus, *Fab.*, *Panz.*, *Dej.* Long. 14—15; larg. 8—8½. Allied to H. austriacus and H. cinereus: it differs slightly in form, and especially in the disposition of the black transverse bands on thorax, which *leave the anterior and posterior margins yellow.* North of Europe.)

(H. verrucifer, *Sahlb.* Long. 14—15; larg. 8—8½. May be recognized at once by the peculiar striæ on the thorax all converging to its centre. Finland; Lapland.)

3. H. Hybneri, *Fab.*, *Oliv.*, *Sch.* Not common. Whittlesea Mere and Yaxley are the only localities in which I have taken it; Mr. Hope has found it at Netley; Mr. Newman has taken it at Camberwell and Lee.

4. H. transversalis, *Fab.*, *Panz.*, *Steph.* Though not abundant, the most common species of the genus. Cambridge, Norfolk, Whittlesea. It would seem that no representative of this genus has been detected either in Scotland or Ireland.

Genus Colymbetes.

1. C. fuscus, *Linn.*, *Fab.*, *Gyll.*, *Sturm*, *Steph.* C. striatus, *Aubé*, *Steph. Man.* C. Paykulli, *Steph. Man.* Long. 16—18; larg. 8—9. Common.

(C. striatus, *Linn.* C. Bogemanni, *Aubé*, *Gyll.* Long. 17—18; larg. 8—8½. With other distinguishing characteristics, the transverse striæ of elytra sufficiently designate this species. North of Europe.)

(C. dolabratus, *Payk.*, *Gyll.* Long. 15—16; larg. 7½—8. Hardly distinct from C. striatus; it is always smaller, relatively narrower; not dilated behind the middle. North of Europe.)

2. C. pulverosus, *Steph.*, *Sturm*, *Erich.* C. conspersus, *Gyll.*, *Aubé.* Apparently more common near London than in any other district.

3. C. notatus, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* This insect sometimes occurs in considerable numbers in the fen districts; Wandsworth

Common, Norfolk, Carlisle, Southend, Bottisham, Dollar, Falkirk, Berwickshire.

4. C. exoletus, *Forst., St.* C. collaris, *Payk., Gyll., Erichs., Aubé.* Not uncommon in Huntingdonshire; near London; Carlisle, Prestwick Car.

5. C. bistriatus, *Bergst., Erichs., Steph.* C. agilis, *Payk., Gyll., Steph., Aubé.* Rare in England; more common in Scotland; Norfolk, Kensington, Cambridge, Dollar, Swinton; near Glasgow; Paisley; Oban, common.

6. C. adspersus, *Fab., Gyll., Steph., Aubé.* The rarest of the genus: I have never been so fortunate as to meet with it, though some years ago it was frequently taken by collectors. It is *shorter* and *relatively broader* than any of the allied species.

7. C. Grapii, *Gyll., Steph., Erich., Aubé.* C. niger, *Lacord.* Not uncommon in the fens of Cambridgeshire; rarer near London. Mr. Newman has taken it abundantly at Birch Wood, in Kent.

Genus Ilybius.

1. I. ater, *Degeer, Fab., Gyll., Steph.* I. quadrinotatus, *Steph.?* Common.

2. I. obscurus, *Marsh, Steph.* I. quadriguttattus, *Lacord, Erich.* Common.

(I. Prescotti, *Mannerh., Aubé.* Appears to be simply a variety of I. fenestratus, taken at Petersburg. Colour castaneous instead of piceous.)

3. I. fenestratus, *Fab., Gyll., Steph., Aubé.* I. subæneus, *Steph.* I. lacustris, *Fab.* Local: occasionally in the fens; Welton Place, near Daventry; Croydon Canal, Parley Copse, Leominster.

4. I. guttiger, *Gyll., Steph., Erich., Aubé.* More common in northern counties than near London; Bewdley Forest, Gosforth, Paisley.

5. I. angustior, *Gyll., Steph., Erich., Aubé.* London district, Whittlesea Mere, Whitsunbank Hill. This local species has more recently been discovered by Dr. Power at Woking, and taken in some abundance by the London entomologists. It is most closely allied to the preceding species, I. guttiger; and though it is possibly distinct, I am not able to discover any clear, satisfactory specific characteristics.

(I. meridionalis, *Dej.* Allied to I. uliginosus; the same form, but broader; colour darker, of a different metallic tint; elytra without the distinct marginal band of the following species.)

6. I. uliginosus, *Linn.* I. fuliginosus, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* D. lacustris, *Panz.* A most abundant species.

Genus Agabus.

(A. serricornis, *Payk.*, *Gyll.* Long. 9—11; larg. 5—6. Oblongo-ovate; nigro-piceous, very slightly æneous; sides of thorax continued in same arc as sides of elytra; sides of elytra and thorax broadly, but indistinctly, ferruginous. In ♂ four terminal joints of antenna dilated. France, Sweden, Lapland, Finland.)

1. A. agilis, *Fab.*, *Erich.*, *Steph. Man.* A. oblongus, *Ill.*, *Gyll.*, *Steph. Illust.*, *Aubé.* D. hæmorrhoidalis, *Fab.*, var. A. ruficollis, *Schaller.* Yaxley; Cambridge; near London; Raehills, Dumfriesshire.

2. A. arcticus, *Payk.*, *Gyll.*, *Steph.* Scotland, Dollar, Isle of Mull; Orkney, August, 1855.

3. A. guttatus, *Payk.*, *Gyll.*, *Steph.*, *Aubé.* Long. 8—9; larg. 4—4½. Common.

(A. dilatatus, *Brull.*, *Aubé.* Long. 8½; larg. 4⅔. Allied to A. guttatus, somewhat larger; elytra not so dark, with a more decided brown; more finely reticulated: probably it will prove to be a local variety. Moræa, France.)

(A. biguttatus, *Oliv.*, *Fairmaire.* Long. 9; larg. 5. Differs from A. dilatatus by its colour, entirely black and shining, more convex in form; differs from A. guttatus in general form, less parallel and more convex, as well as by its greater brilliancy of colour; the reticulations are much less distinct than on A. guttatus. France, Spain, Italy, Sicily.)

4. A. fontinalis, *Steph.*, *Ill.* A. guttatus, var., *Steph. Man.* A. vittiger, *Steph.*, not *Gyll.*, *Aubé.* By no means an abundant species. Devonshire, Sussex, Dorchester; Mr. Newman has taken it this autumn on Car Caradoc, in Shropshire. This insect may be determined at once by the third tooth on the anterior feet of the male.

(A. Hæffneri, *Mannerh.* Long. 7¼; larg. 3¾. Evidently smaller than A. guttatus, comparatively rather shorter, more finely reticulated; the three lines on the elytra are less distinct: the posterior angles of the thorax more obtuse and almost rounded. Sweden.)

(A. Wasastjernæ, *Sahlb.* Long. 7½; larg. 3¾. However closely resembling (by descriptions) the former species, it appears to be distinct: thorax less rounded on sides, posterior angles of thorax

sharper, and in no degree rounded, punctuation of elytra more distinct. Lapland, Finland.)

5. A. chalconotus, *Panz.*, *Ill.*, *Steph.* A. cyaneus, *Steph. Illust.*, var. A. montanus, *Steph.* A. nigro-æneus, *Marsh*, *Steph.*, not *Erich.* A. aterrimus, *Steph.* A variable and common species. Long. 8—10; larg. $4\frac{1}{2}$—$5\frac{1}{2}$.

6. A. affinis, *Payk.*, *Gyll.*, *Steph.*, *Sturm.* C. branchiatus, *Bab.*, *Steph.* Long. $6\frac{1}{3}$—$7\frac{1}{4}$; larg. $3\frac{3}{4}$—4. Not common. Near London; Netley, Norfolk, Cambridge. I have found this species more abundantly on chalk than other soils.

(A. elongatulus, *Gyll.* Long. 8; larg. $3\frac{2}{3}$. Allied to A. affinis, but longer; posterior angles of thorax more rounded, and not pointing backwards towards elytra; colour of elytra black, with a broad and indistinct margin of brown. Lapland.)

7. A. striolatus, *Gyll.*, *Aubé.* A. rectus, *Bab.* Long. 8; larg. $4\frac{1}{4}$. Oval, elongated, rounded behind, black, scarcely shining; head black, with labrum and two spots in front ferruginous; antennæ and palpi ferruginous; thorax black with narrow lateral margins of yellow, covered with linear impressions pointing in all directions; elytra with impressions less distinct: black, without spots, with three almost obsolete lines of punctures; legs ferruginous. This insect, by some oversight, is omitted in Schaum's list: according to Babington (Ann. Nat. Hist. vol. vi. p. 54) it was first discovered in Horning Marshes by the Rev. J. L. Brown, in March, 1839; and again in March, 1840. In May, 1855, I took a single specimen in the same locality.

(A. vittiger, *Gyll.*, *Erich.* Long. $7\frac{1}{2}$; larg. $3\frac{3}{4}$. Body more oval, less parallel than A. striolatus; thorax simply and distinctly reticulated; elytra more convex; black, with a short longitudinal line, hardly visible, placed near the middle of length, and some distance from external margin. North of Europe.)

(A. melanarius, *Aubé.* Long. $8\frac{1}{2}$; larg. $4\frac{3}{4}$. Differs from A. striolatus by its rather larger size, form more oval, the less generally longitudinal direction of the linear punctures on elytra, and also by a ferruginous narrow band at their margin, visible only when the insect is wetted: differs from A. vittiger, among other peculiarities, by the frequent linear impressions on thorax, pointing in all directions, as in A. striolatus.)

8. A. paludosus, *Fab.*, *Gyll.*, *Steph.* A. striolatus, *Steph.*, not *Gyll.* Not rare: generally found throughout the country in running water.

9. A. congener, *Payk.*, *Gyll.*, *Steph.* A. confinis, *Steph.*, not *Gyll.* Long. $7\frac{1}{2}$—8; larg. $4\frac{1}{4}$—$4\frac{1}{2}$. Suffolk, Norfolk; rare near London: but little is known of the localities or habits of this insect.

(A. confinis, *Gyll.*, *Sahlb.* Long. $8\frac{1}{2}$—$9\frac{1}{2}$; larg. $4\frac{3}{4}$—5. Head and thorax black, without the narrow ferruginous border of A. congener; elytra slightly elongate, dark brown, with lateral borders cloudily but broadly testaceous; with 3 longitudinal lines of punctures; smooth, not reticulated as in A. congener. North of Europe, Sweden, Finland.)

(A. nigricollis, *Zoubkoff.* Long. 9; larg. $4\frac{3}{4}$. Head black, labrum and two spots in anterior red; thorax black, lateral margins slightly ferruginous; elytra slightly elongated behind, varying in colour from pitchy brown to bright red-brown; with two spots, hardly, sometimes not at all, visible, one on external margin, the other at apex.)

10. A. femoralis, *Payk.*, *Gyll.*, *Steph.*, *Sturm.* A. assimilis, *Sturm*, *Aubé.* Near London; Cambridge; generally distributed.

11. A. uliginosus, *Payk.*, *Gyll.*, *Sturm.* Long. 7; larg. 4. Southend; Windsor; rare near Edinburgh; Aberdeenshire. Rare. A. dispar, *Bold* (Zool. 1849, xxiv.), must be referred to this species, as I have ascertained by comparison of a fine series which Mr. Bold obligingly allowed me to examine.

(A. fuscipennis, *Payk.* Long. $9\frac{1}{2}$—10; larg. $5\frac{1}{2}$—$5\frac{3}{4}$. Fuscous; thorax dark brown, irregularly punctuated with a few more deeply impressed punctures on anterior margin; lateral borders broadly ferruginous, anterior narrowly; elytra oval, considerably dilated in front of the middle; colour and broad lateral margins in thorax, punctuation more fine. North of Europe.)

(A. Reichii, *Aubé.* Long. $7\frac{1}{2}$; larg. $4\frac{1}{2}$. Closely allied to A. uliginosus: differs in form, which is more convex, and by the greater dilatation of elytra a little in front of the middle: it appears to correspond in colour and punctuation entirely with A. uliginosus.)

12. A. abbreviatus, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* A common species in the Fen districts; Windsor; Mr. Newman has taken it at Leominster.

13. A. maculatus, *Linn.*, *Fab.*, *Steph.* Frequents especially brooks and running water throughout the kingdom: dark varieties are occasionally met with.

14. A. vitreus, *Payk.* A. didymus, *Oliv.*, *Aubé.* Generally distributed, but not abundant.

15. A. bipunctatus, *Fab.*, *Gyll.*, *Aubé.* A. nebulosus, *Forst.*, *Steph.* Very common.

16. A. conspersus, *Marsh, Steph.* A. subnebulosus, *Steph., Aubé.* Aldborough, Suffolk; near Northampton; Musselburgh.

17. A. brunneus, *Fab., Aubé, Steph. Man.* D. castaneus, *Sch.* C. ferrugineus, *Steph. Ill.* Rare. South Devon, by Dr. Leach in spring of 1825; Dartmoor; near Caernarvon: I am indebted to Dr. Power for specimens which he took in the New Forest.

18. A. Sturmii, *Schönh., Gyll., Steph., Aubé.* Abundant.

19. A. bipustulatus, *Linn., Fab., Steph.* A. carbonarius, *Fab., Gyll.* Abundant.

(*Var.* C. Snowdonius, *Newm., Steph.* This is an interesting form: I think it cannot be regarded a species, but as an extreme mountain variety of A. bipustulatus. Mr. Newman has obligingly forwarded to me one of his few remaining specimens; I have scores in my cabinet and boxes of A. bipustulatus, but have none that approach the peculiarities of this example,—the two foveæ at base of prothorax, and the very apparent posterior attenuation of elytra: I notice the subject here, as it would be very desirable if a *series* of the insect could be obtained from Snowdon; single examples are always unsatisfactory as the basis of an opinion in questions of doubt.

(A. subtilis, *Er.* Differs from A. bipustulatus by its smaller size, more convex form; elytra more finely striolated and reticulated.)

(A. Solieri, *Aubé.* A. alpestris, *Heer.* Long. 10; larg. $5\frac{1}{4}$. Allied to A. bipustulatus, but is distinct by its narrower form; more depressed; mouth narrower, and more prominent; thorax smaller, *rounded* at the sides, with posterior angles obtuse; sides of elytra more parallel. Pyrenees, Vernet, Grenoble, Savoy.)

Genus Noterus.

1. N. crassicornis, *Fab., Gyll., Steph.* N. capricornis, *Herbst, Sturm.*

2. N. semipunctatus, *Fab., Erich., Steph. Man.* N. sparsus, *Marsh, Curt., Steph. Illust.* Long. 5; larg. $2\frac{1}{4}$.

(N. lævis, *Dej., Sturm.* Long. $4\frac{1}{2}$; larg. $2\frac{1}{2}$. Approaches in form N. semipunctatus, in antennæ N. crassicornis: may be distinguished from both by the smoothness of the elytra, the few impressions upon which are very minute. France and other countries.)

Genus Laccophilus.

1. L. minutus, *Lin., Fab., Erich., Steph.* L. interruptus, *Panz., Aubé.* L. hyalinus, *Marsh, Steph.* Long. 5; larg. $2\frac{3}{4}$.

2. L. hyalinus, *Deg.*, *Erich.*, *Steph.* L. minutus, *Marsh*, *Steph.*, *Aubé.* L. obscurus, *Panz.* Long. $4\frac{3}{4}$; larg. $2\frac{2}{3}$.

(L. testaceus, *Aubé.* Long. 5; larg. 3. Broader and more convex than L. hyalinus; without the longitudinal markings on elytra which distinguish L. minutus. France, &c.)

(L. variegatus, *Germ.*, *Sturm.* Long. 4; larg. $2\frac{1}{3}$. At once known by the broad luteous transverse bands on elytra, interrupted at the suture; one a little removed from the base, the other behind the middle. France.)

Genus Hyphidrus.

1. H. ovatus, *Linn.* ♂, *Steph.*, *Erich.*, *Aubé.* D. ferrugineus, *Linn.* ♀, *Don.* H. ovalis, *Fab.*, *Gyll.* ♂. H. gibbus, *Fab.*, *Gyll.* ♀.

Var. H. variegatus, *Steph.*

(H. variegatus, *Illig.*, *Dej.* Long. $4\frac{1}{2}$; larg. 3. Size of H. ovatus: at once distinguishable by its markings on elytra. France.)

Genus Cnemidotus.

1. C. cæsus, *Dufts.*, *Gyll.*, *Steph.*, *Aubé*, *Erich.* C. impressus, *Panz.* Near London; Fen districts, Northampton, &c.

(C. rotundatus, *Aubé*, *Fairmaire.* Long. $3\frac{2}{3}$; larg. 2. Distinct from C. cæsus by brighter colour, form broader and more rounded, punctuation more deep and distinct. France.)

Genus Hydroporus.

1. H. inæqualis, *Fab.*, *Gyll.* Hygrotus reticulatus, *Steph.* Long. 3; larg. 2.

2. H. reticulatus, *Fab.*, *Gyll.*, *Erich.*, *Aubé.* Hygrotus collaris, *Fab.*, *Steph.* H. affinis, *Steph. Ill.* Long. $3\frac{1}{4}$; larg. 2.

(H. quinque-lineatus, *Zett.* Long. $3\frac{1}{4}$; larg. 2. Allied to H. reticulatus, which it resembles in size, form and maculation; it differs in punctuation; in H. reticulatus the elytra are densely covered with fine punctures interspersed with others deep and decided: in 5-lineatus the surface of elytra is covered with deep punctures. Lapland.)

3. H. decoratus, *Gyll.* Near York; Norfolk; near London; Northamptonshire. Long. $2\frac{1}{4}$; larg. $1\frac{5}{8}$.

(H. cuspidatus, *Kunz.*, *Germ.* Long. 3; larg. 2. Short, ovate, densely punctured, shining, ferruginous or brown; thorax ferruginous, slightly darker on anterior and posterior margins; external margin of elytra and two transverse irregular bands dark brown; apex lengthened into a point. France, Italy, Germany.)

4. H. pictus, *Fab., Gyll., Steph., Aubé.* Abundant throughout the country. H. arcuatus, *Fab., Panz.* Long. $2\frac{1}{2}$; larg. $1\frac{1}{3}$.

(H. fasciatus, *Dahl., Dej. Cat.* Long. $2\frac{3}{4}$—3; larg. $1\frac{1}{2}$—$1\frac{3}{4}$. Black, almost impunctate; thorax with lateral margins ferruginous; elytra rufo-testaceous, with very narrow border at base; suture, two transverse bands and lateral margin black. France.)

5. H. lepidus, *Oliv., Schon., Aubé.* H. scitulus, *Steph.* Not uncommon in fens, affects muddy ditches and pools.

6. H. confluens, *Fab., Panz., Gyll.* Long. $3\frac{1}{2}$; larg. 2.

(H. nigrolineatus, *Stev.* H. blandus, *Germ.* H. enneagrammus, *Ahr., Sturm.* Long. 4; larg. 2. Shining; head, thorax, elytra, pale yellow; in the latter the suture and four lines clear black; body beneath black; legs testaceous; form longer than H. confluens. Russia and central Europe.)

(H. pallens, *Mannerh.* Long. $3\frac{1}{4}$; larg. $1\frac{7}{8}$. Subconvex, deeply punctured; testaceous; anterior and posterior margins of thorax somewhat darker; elytra somewhat elongate, with two punctured striæ; the suture and a line on exterior margin hardly darker; body beneath black; legs testaceous. Lapland.)

7. H. rivalis, *Gyll., Aubé.* H. fluvatilis, *Steph.* Common in streams in the North of England. Long. 3; larg. $1\frac{2}{3}$.

8. H. Sanmarkii, *Sahlb.* H. assimilis, *Gyll., Aubé, Steph.* This insect is absolutely the same as H. rivalis, *Gyll.*, in everything but colour. I believe it will be found to be a variety.

9. H. septentrionalis, *Gyll., Aubé.* H. alpinus, *Kunz., Steph.* Found occasionally with H. rivalis, but more sparingly; it may be distinguished at once by its longer form. Long. $3\frac{1}{2}$; larg. $1\frac{2}{3}$.

(H. alpinus, *Payk., Gyll., Germ.* H. bidentatus, *Gyll., Aubé*, ♀. H. borealis, *Gyll.* (?) Long. $4\frac{1}{2}$; larg. $2\frac{1}{4}$. Closely allied to H. Davisii, somewhat larger; lateral borders of thorax rounded; not so depressed; more narrowed behind; colour not so dark. North of Europe.)

10. H. Davisii, *Curt., Steph., Aubé.* H. borealis, *Aubé, Steph.*, not *Gyll.* Not uncommon in running streams. Cambridge, Norfolk, Lincolnshire. Long. 4; larg. $2\frac{1}{4}$.

11. H. assimilis, *Payk., Steph.* H. frater, *Kunz., Steph., Aubé.* H. halensis, *Steph. Man.* H. areolatus, *Steph. Ill.* Common. Long. $4\frac{2}{3}$; larg. $2\frac{1}{2}$.

(H. hyperboreus, *Gyll.* H. affinis, *Sturm.* Long. 4; larg. $2\frac{1}{3}$. Differs from H. assimilis by absence of any spots on elytra caused by confluence of longitudinal lines; on margin of elytra two small linear

marks; between first stria and suture rudiment of another stria, always shorter than others. Lapland.)

(H. luctuosus, *Aubé.* Long. $5\frac{1}{2}$; larg. $2\frac{2}{3}$. Black; head in front rufo-ferruginous; sides of thorax much rounded; on elytra two large transverse spots at base; two round at margin, nearer the apex; two at the apex; and two oblong near the suture, a little beyond the middle, all pale; at apex denticulated. France, Sardinia.)

12. H. halensis, *Fab., Germ., Erich., Aubé.* H. areolatus, *Dufts.* H. griseostriatus, *Steph.* Long. $4\frac{1}{4}$—$4\frac{1}{2}$; larg. $2\frac{1}{3}$—$2\frac{1}{2}$. Taken in a deep lake in the Isle of Mull by Mr. Hislop and myself; at Raehills, *Rev. W. Little:* probably to be found in other parts of Scotland.

(H. griseostratus, *Deg., Gyll.* Long. $4\frac{3}{4}$; larg. $2\frac{1}{3}$. Thorax with sides hardly rounded; testaceous, with two dark spots at base; elytra with seven lines more or less confluent; sixth and seventh lines sometimes interrupted, and united again in the form of spots: distinct from H. halensis, *Fab.*, by longer form, thorax narrower, lines on elytra more confluent. Throughout Europe.)

(H. Ceresyi, *Aubé.* Long. 5; larg. $2\frac{1}{3}$. Allied to H. griseostriatus, but larger; thorax somewhat broader, posterior angles sharper; elytra with four entire longitudinal lines, and a fifth rudimentary at suture. France.)

(H. canaliculatus, *Dej., Aubé.* Long. $5\frac{1}{4}$; larg. $2\frac{3}{4}$. Testaceous, slightly pubescent; thorax with two small dark spots near the base; elytra with six or seven lines and irregular spots; with three longitudinal striæ faintly impressed; elytra broader than thorax; body beneath black; legs testaceous. Spain, France.)

13. H. elegans, *Illig., Panz., Steph.* H. brevis, *Sturm.* H. depressus, *Steph., Aubé.* Not common in Scotland; found in many of the southern counties of England. Long. 5; larg. $2\frac{2}{3}$.

(H. marginicollis, *Dej.* A variety, without any black markings, of H. elegans, *Illig.*)

(H. Sansii, *Solier.* Long. 5; larg. $2\frac{1}{2}$. Resembles H. elegans, from which it differs in outline; margin of thorax more rounded; elytra more parallel and compressed; the two teeth at apex of elytra not so acute. Spain.)

(H. depressus, *Fab., Gyll., Steph.* Found in Sweden: is dark beneath, and of a more elongated shape than H. elegans, *Ill.*: it is not ascertained that it is a mere local variety.—Schaum, in Zool. 1891.)

14. H. duodecim-pustulatus, *Fab.*, &c. Scotland; throughout England: I found a black variety in profusion in the Isle of Bute,

September, 1854, also in a small stream in Isle of Man: Mr. Newman has found the same variety at Leominster. Long. 6; larg. 3.

15. H. parallelogrammus, *Ahr.*, *Sturm* ♂, *Aubé* ♀, *Erich.* ♂ ♀. H. lineatus, *Marsh* ♀, *Steph.* ♂ ♀. H. consobrinus, *Kunz.*, *Aubé* ♂. H. nigrolineatus, *Kunz.*, *Sturm.* In profusion near Sheerness; Southend, Norwich, Ipswich, Wandsworth Common. Long. 5; larg. $2\frac{2}{3}$.

16. H. novem-lineatus, *Rudd*, *Steph. Ill.* H. nigro-lineatus, *Gyll.*, *Steph.*, not *Stev.*, *Aubé.* H. consobrinus, *Zetterst.* ♂. H. Schönherii, *Aubé* ♂. H. parallelus, *Aubé* ♀. Bute, Sept., 1854; not common; two specimens from gravel-pits, Weyhill, Oct., 1828. Long. 4; larg. 2.

17. H. picipes, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* H. alternans, *Kunz.*, *Steph. Ill.*: ♀ var. H. lineellus, *Gyll.*, *Aubé.* Occasionally near London; Norfolk, Salop, Devonshire, Southend. I am indebted to my friend Mr. Wollaston for recent examples which he took at Killarney, Autumn, 1854. Long. 5; larg. $2\frac{3}{4}$.

18. H. dorsalis, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* More frequent than the above. I have taken it freely in Norfolk and Huntingdonshire, also Cambridge Fens; Cantire; near London. This insect varies much in maculation. Long. $4\frac{3}{4}$—5; larg. $2\frac{1}{2}$—$2\frac{2}{3}$.

(H. lapponum, *Gyll.* Long. 5; larg. $2\frac{1}{2}$. Somewhat depressed; punctulated; pubescent; size and general outline of H. dorsalis; head, thorax and elytra dark brown; margins of two latter inclined to ferruginous; sides of thorax more rounded than in H. dorsalis. Lapland; "peut-être aussi en Allemagne et en Angleterre.")

19. H. opatrinus, *Germ.*, *Steph.*, *Aubé.* This is one of those unsatisfactory insects, the claims of which for admission to our Fauna rest not upon insufficient but upon too remote authority; I cannot ascertain that it has been taken since 1829, by Mr. Hope, "Netley; Salop." It is a very distinct insect, size of H. dorsalis, black, punctulate, clothed with dark green pubescence; thorax broad and rounded at sides. Taken throughout Europe. Long. $4\frac{1}{2}$—5; larg. $2\frac{1}{3}$—$2\frac{3}{4}$.

(H. platynotus, *Germ.* H. murinus, *Sturm.* Long. $4\frac{1}{4}$; larg. $2\frac{1}{2}$. Allied to H. opatrinus, which it closely resembles in colour and punctuation; it is always smaller, comparatively broader, more depressed; margin of thorax continued in almost the same line as that of margin of elytra; and not forming an angle with it, as in H. opatrinus.)

(H. Aubéi, *Muls.* Long. $4\frac{1}{2}$. Dark red-brown; thorax as large as base of elytra, and does not form an apparent angle with it: differs

from H. platynotus in its more parallel form; more depressed; sides of thorax less rounded; punctuation of elytra more decided, of head and thorax more fine. France.)

20. H. latus, *Steph.*, *Curt.* H. ovatus, *Sturm*, *Erich.*, *Aubé.* H. castaneus, *Heer.* Long. $4\frac{3}{4}$; larg. $2\frac{3}{4}$. Marston Lodge, Yorkshire, *Rev. G. T. Rudd:* "Ouseburn in July," *Bold's Catalogue of Northumberland Insects;* Mr. Bold, who has recently taken it, has kindly supplied my cabinet with examples.

21. H. palustris, *Linn.*, *Sturm*, *Steph.*, *Erich.* H. sexpustulatus, *Fab.*, *Gyll.*, *Aubé.* H. lituratus, *Fab.*, *Panz.* H. proximus, *Steph. Ill.* H. cambriensis, *Steph.*, *Curt.* The most common, and also one of the most variable of our Hydropori: I have specimens from Argyleshire perfectly black. Long. 4; larg. 2.

22. H. vittula, *Erich.* H. ambiguus, *Aubé.* H. nigrita, *Steph.* Nowhere abundant; sparingly in Norfolk, May, 1854; near Oban; Whittlesea Mere; occasionally near London. Long. $2\frac{2}{3}$; larg. $1\frac{3}{4}$.

23. H. xanthopus, *Steph.* H. planus, *Steph. Man.* H. flavipes, *Steph. Ill.*, not *Fab.* H. lituratus, *Brullé*, *Aubé.* In abundance at Southend; near London; Hertford, Ripley, Norfolk, Wandsworth Common, Ely. Long. $3\frac{1}{2}$—$3\frac{3}{4}$; larg. $1\frac{4}{5}$—2.

(H. limbatus, *Dalh.* Long. $4\frac{1}{4}$; larg. $2\frac{1}{3}$. Allied to H. xanthopus; differs in its markings on elytra; may also be distinguished by its larger size, more abundant pubescence; anterior of head and sides of thorax more distinctly ferruginous; antennæ entirely testaceous. France.)

(H. analis, *Aubé.* Long. $3\frac{3}{4}$; larg. $1\frac{5}{6}$. Differs from H. xanthopus in its markings on elytra; transverse band at base of elytra not so broad, or represented by one or two spots; more narrow form; pubescence more abundant: differs also from H. xanthopus and H. limbatus by punctures on abdomen, which are close and frequent, whereas in these two species they are rare and isolated. France.)

(H. marginatus, *Dufts.*, *Aubé*, *Fairmaire.* Long. $4\frac{1}{2}$. Head black, vertex and anterior red; thorax black, with broad, testaceous or ferruginous lateral margins; elytra dark brown or reddish; at their base a testaceous broad irregular transverse band, which is continued along the margins of elytra; body beneath black; legs ferruginous or testaceous. France, Germany, Spain. This species I took in England at Woburn Sands, Bedfordshire, September 3, 1848. I do not, however, introduce it into our lists until it has actually been compared with examples in the foreign cabinets.)

(H. Marklini, *Gyll.*, *Zett.* Long. $3\frac{1}{4}$; larg. 2. Head testaceous, ferruginous on sides and behind; thorax testaceous, with anterior and posterior margins broadly black; elytra black, with broad irregular griseous fascia across the base, into which run five or six abbreviated longitudinal lines of same colour; sides of elytra griseous. Sweden.)

24. H. pubescens, *Gyll.*, *Aubé.* H. melanocephalus, *Marsh*, *Steph.*, *Sturm.* H. caliginosus, *Steph. Man.* H. planus, *Marsh.*, *Steph. Illust.* Dr. Schaum retains with propriety the name of H. pubescens for this species (although H. melanocephalus, *Marsh.*, has the claim of priority), in order to avoid confusion with H. melanocephalus, *Gyll.*, *Aubé*, a very distinct species, which has not yet received any other name. Long. $3\frac{1}{2}$; larg. $1\frac{3}{4}$.

25. H. melanocephalus, *Gyll.*, *Aubé.* Long. $3\frac{3}{4}$; larg. $1\frac{5}{6}$—2. Black, punctulate, hardly shining; sides of thorax very slightly rounded, continued in same line with sides of elytra; elytra rounded towards the apex; legs ferruginous, feet black; body beneath black. I took this species on the hills behind Oban, September, 1854, in swampy ground caused by one of the hill rivulets; had it not been night, when I could not distinguish the insects in my net, I might have no doubt taken many: it will probably be found elsewhere.

(H. glabriusculus, *Sahlb.* Long. $3\frac{1}{4}$; larg. $1\frac{1}{2}$. Allied to H. melanocephalus in every respect, of which I believe, so far as I can gather from descriptions, that it may prove a variety; much smaller in size; proportionally somewhat narrower; feet testaceous; legs ferruginous. Lapland.)

26. H. erythrocephalus, *Linn.*, *Fab.*, *Gyll.*, *Steph.*, &c. H. deplanatus, ♀, *Gyll.*, *Aubé.* Long. 4; larg. 2. Very common throughout Great Britain.

27. H. nigrita, *Fab.*, *Gyll.*, *Aubé.* H. trivialis, *Steph.* Long. 3—$3\frac{1}{2}$; larg. $1\frac{3}{4}$—$1\frac{5}{6}$. This species is, by some accident, omitted in Schaum's valuable list of our British species (Zool. 1892). Southend; near London, by Dr. Power; Norfolk, Cambridge, Northampton. "Dollar, Edinburgh, Paisley."—*Murray's Catalogue.*

(H. brevis, *Sahlb.* Long. $2\frac{3}{4}$; larg. $1\frac{1}{2}$. Closely resembles in form H. nigrita, is half the size; no trace of longitudinal lines on elytra. Finland. *Var.* of H. nigrita. ?)

(H. neuter, *Fairmaire.* Long. $3\frac{1}{3}$. Allied to H. nigrita, same colour, slightly larger, more elongated; head anteriorly reddish, finely punctured; sides of thorax continuing in same line as those of elytra, fully and distinctly punctured: elytra as in H. nigrita, more pubescent. This species differs from H. melanarius by its form, not

parallel, less depressed, punctuation more fine; from H. melanocephalus by its form, not parallel, less elongated, smaller size and pubescent elytra. France.)

(H. nivalis, *Heer.*, *Fairmaire.* Long. 3—4. Much resembles H. nigrita and H. melanocephalus; differs from H. nigrita by its larger size, more elongated form, suture always punctate at base, head black, legs more obscure; differs from H. melanocephalus by its smaller head, thorax uniform in punctuation, elytra not parallel, their sides somewhat broader at base than base of thorax. France.)

28. H. erythrocephalus, *Linn.*, *Fab.*, *Gyll.*, *Aubé.* H. deplanatus, *Gyll.*, *Aubé*, var. ♀. One of our most common species. Long. $4\frac{1}{4}$; larg. $2\frac{1}{6}$.

(H. vagepictus, *Fairm.* Long. 4. Much resembles H. erythrocephalus, more convex, more narrow behind; thorax forms with base of the elytra a more distinct angle; lateral band of elytra larger and more distinct: differs from H. rufifrons by its more oval form, less parallel sides of elytra, head larger, thorax less narrowed in front, punctuation not so deep, and by the angle of thorax with sides of elytra. France.)

29. H. rufifrons, *Dufts.*, *Gyll.*, *Sturm.* H. piceus, *Steph.* I have taken this species in the Huntingdonshire Fens and near Cambridge: it is by no means common: Norfolk; Berwickshire, rare; occasionally near Paisley. Long. 5; larg. $2\frac{1}{2}$.

30. H. oblongus, *Steph.* H. nitidus, *Sturm*, *Erich.*, *Aubé.* This insect is to be taken in abundance only in the very early spring, or even before spring has appeared: I took it very sparingly round Horning, Norfolk, in May, 1854. Long. $4\frac{1}{2}$; larg. $2\frac{1}{4}$.

31. H. ferrugineus, *Steph.* H. victor, *Aubé.* Long. 4; larg. 2. The only known localities for this species are near Collingbourne Wood, once in 1828, and several in a stream at Kimpton during the spring of 1829: it resembles H. memnonius, but has thorax more rounded at sides, is more parallel in form. It is taken in France, Constance, &c.

32. H. melanarius, *Sturm*, *Erich.* Long. $3\frac{3}{4}$; larg. 2. Resembles somewhat H. melanocephalus, *Gyll.*, but may be distinguished at once by its more parallel sides; head and thorax decidedly larger, elytra continuing exactly the line of the thorax, and covered with deeper and more distinct punctuation; colour more brilliant black; legs and antennæ entirely ferruginous. I took two examples of this insect in Horning Fen, 1854.

33. H. memnonius, *Nicolai, Erich., Aubé, Steph.* H. subelongatus, *Steph.* ♂. H. marginatus, *Steph.* ♂ immature, not *Dufts., Aubé.* H. deplanatus, *Steph.* ♀, not *Gyll., Aubé.* H. niger, *Sturm* ♂. H. jugularis, *Bab.* ♂ ♀. H. castaneus, *Aubé* ♀. Long. 4; larg. 2. Abundant occasionally: Southend; near Peterborough; Whittlesea; near London; Daventry, Newcastle; Raehills, Dollar, Kinross-shire, Tweed.

34. H. Gyllenhalii, *Schiödte.* H. rufifrons, *Steph.*, not *Dufts.* H. piceus, *Aubé*, not *Steph., Sturm* or *Erichson.* Long. 4; larg. 2. Occasionally throughout the country, more abundantly in the northern counties; common in Cantyre; Dalmeny, *Rev. W. Little.*

(H. incertus, *Dej.* Long. 4; larg. 2. Size and form of H. Gyllenhalii, which it closely resembles, and of which it may be but a variety; it is, however, rather more depressed, deeper black, more brilliant, more finely punctured, elytra with two longitudinal lines of points; sides of thorax not so full and rounded, more oblique. France and South Europe.)

35. H. tristis, *Payk., Gyll., Sturm, Erich., Aubé.* Long. $3\frac{1}{5}$; larg. $1\frac{2}{3}$. This species, of which Schaum found but two examples in Stephens's collection, is generally distributed, though somewhat local and rare: I have taken it in Lancashire; in Argyleshire; in Mull; "not common near Prestwick Carr," *Mr. Bold:* it seems to affect especially peaty soils on moors and sides of mountains.

36. H. elongatulus, *Sturm.* Long. $3\frac{1}{4}$. Closely allied to H. tristis, but differs from it by its more compressed, less oval form, elytra rounded at sides, more distinctly pubescent, thorax somewhat narrower;* appears to vary very considerably in size. This species was first detected by my friend Mr. Wollaston, who took a few specimens on Midgley Moor, Yorkshire: I have taken it since in Derbyshire, and previously in Scotland. It is not an uncommon species.

(H. striola, *Gyll.* Long. $3\frac{1}{5}$; larg. $1\frac{2}{3}$. Of somewhat the form of H. tristis, more depressed, more finely punctuate, and distinguishable by the colour of the elytra; thorax as in H. tristis. Elytra of H. tristis, according to Aubé, are "castaneo-brunnea," "d'un brun ferrugineux;" of H. striola "fusco-brunnea," "brunnâtres;" the latter has a transverse fascia at base of elytra, and exterior lateral band of dark brown; within this band is a dark longitudinal spot near the centre. France, Germany, Sweden.)

* According to Fairmaire, the colour is dark brown or brown: this is the case in some of my examples, but in the majority it is deep black.

(H. notatus, *Sturm.* Long. $3\frac{1}{3}$; larg. $1\frac{2}{3}$. Resembles in colour and general appearance H. striola, but differs essentially in outline; it is narrower, and more parallel in form, and the punctuation of elytra more distinct. Berlin.)

(H. neglectus, *Schaum, Fairmaire.* Long. $2\frac{1}{2}$. Oval, slightly elongated; depressed towards suture of elytra: differs from H. tristis by smaller size, more contracted, sides of elytra more compressed, forming a more distinct angle with sides of thorax: distinct from H. umbrosus by its form, longer, somewhat more depressed, sides of thorax more fully rounded, forming an angle with base of elytra; elytra less pubescent and more finely punctuate. France.)

37. H. angustatus, *Sturm, Erich., Aubé.* H. tristis, *Steph.*, not *Payk.* H. acuminatus, *Sturm.* Long. $3\frac{1}{4}$; larg. $2\frac{2}{3}$. In abundance in Gravesend Marshes in the spring: Sheerness; not uncommon throughout all the fen districts; "Prestwick Car, elsewhere near Newcastle," *Mr. Bold;* "near Swinton, Berwickshire; Raehills," *Mr. Murray.*

38. H. obscurus, *Sturm, Erich., Aubé.* H. tristis, *var. β., Gyll.* H. umbrosus? *Steph.* Long. 3; larg. $1\frac{5}{8}$. Argyleshire, near Connell Falls, plentifully; near Killarney, by Mr. Wollaston.

39. H. umbrosus, *Gyll., Sturm, Aubé, Erich.* H. minutus, *Steph.* Long. $2\frac{3}{4}$; larg. $1\frac{5}{8}$. Local. Not common near London. I took several specimens in Norfolk, May, 1854, in a muddy swamp; sparingly near Paisley.

40. H. Scalesianus, *Steph.* H. pygmæus, *Sturm, Aubé.* Long. 2; larg. $\frac{7}{8}$. There is but one British example of this insect in existence, in the cabinet of the late Mr. Stephens; Mr. Scales, its discoverer, resided at Beechamwell, near Swaffham, Norfolk, a high chalk district; it has been taken in abundance near Berlin by Erichson, but is very local.

41. H. lineatus, *Fab., Oliv., Gyll., Sturm.* H. ovatus, *Fab.* H. pygmæus, *Fab., Steph.* H. ovalis, *Marsh., Steph.* Long. $3\frac{1}{4}$; larg. $1\frac{3}{4}$. Common.

42. H. flavipes, *Oliv., Aubé.* H. minimus, *Steph.*, not *Scop.* H. concinnus, *Steph.* H. marmoratus? *Bakewell, Steph.* Long. $2\frac{3}{4}$; larg. $1\frac{1}{3}$. Local: taken by Mr. Wollaston in Ireland and Anglesea; occasionally near London; Devonshire.

(H. meridionalis, *Aubé.* Long. $2\frac{1}{3}$; larg. $1\frac{1}{4}$. Closely allied to H. flavipes, smaller, narrower, more convex, may be distinguished at once by the colour of the thorax; testaceous, with the posterior and

anterior margins of a dark brown colour, which meets sometimes in the middle of the disk.)

43. H. granularis, *Fab.*, *Gyll.*, *Steph.*, &c. Long. $2\frac{1}{2}$; larg. $1\frac{1}{4}$. Common.

44. H. geminus, *Fab.*, *Gyll.*, *Steph.*, &c. H. pusillus, *Fab.* Long. $2\frac{1}{2}$; larg. 4. Common in shallow muddy water in the Fen districts. Wimbledon Common, Coombe Wood, Gosforth.

(H. varius, *Dej.* Long. $2\frac{1}{2}$; larg. $1\frac{1}{3}$. Black, slightly pubescent; margin of thorax ferruginous; elytra ferruginous, with base, band along suture dilated on either side at the middle, and again near apex, black; on the shoulders a black mark, and another oblong one on the disk, bounded by a narrow line along the margin of elytra. France, Germany.)

45. H. unistriatus, *Ill.*, *Oliv.*, *Steph.* H. parvulus, *Payk.*, *Gyll.* Hyg. bisulcatus, *Curt.* Long. $2\frac{1}{5}$; larg. $1\frac{1}{5}$. A rare species apparently: one specimen near Cambridge; Devonshire; occasionally near London.

(H. bicarinatus, *Clairv.* Hyph. costatus, *Gyll.* Long. $2\frac{1}{5}$; larg. $1\frac{1}{3}$. Broader than H. unistriatus, markings somewhat similar, but more testaceous in colour. France.)

(H. pumilus, *Dej.* Long. $2\frac{1}{6}$; larg. $1\frac{1}{3}$. Broader than H. unistriatus, markings somewhat similar, but more testaceous in colour; distinguishable from H. bicarinatus by sides of the thorax somewhat more rounded, anterior and posterior margins more broadly black; this colour hardly reaches lateral margins. France.)

46. H. minutissimus, *Germ.*, *Aubé.* H. trifasciatus, *Woll.* Long. 2; larg. $\frac{7}{8}$. This at present is exclusively an Irish species: it was taken some years ago in the rivers near Cork by the late Mr. Clear; and described by Mr. Wollaston as H. trifasciatus in the 'Annals of Natural History.' The species is not uncommon in France and other countries, and may probably be detected again by any one who will search the Cork district.

Genus Haliplus.

1. H. elevatus, *Panz.*, *Gyll.*, *Steph.*, *Aubé*, *Erich.* Rather a local insect: running streams near Bexley; sparingly in the reservoir near Daventry; Ouseburn and Boldon; Mr. Newman takes it in the canal at Leominster; also occasionally in Scotland.

2. H. mucronatus, *Steph.* H. parallelus, *Bab.* H. badius, *Aubé.* Long. $4\frac{1}{5}$; larg. $2\frac{1}{5}$. We know but little of this insect: Aubé took it very abundantly in September. Compiègne.

3. H. fulvus, *Fab.*, *Clairv.*, *Babington*, *Erichs.*, *Steph. Man.* H. ferrugineus, *Gyll.*, *Aubé.* H. ferrugineus, var., *Steph. Ill.* Long. 4; larg. $2\frac{1}{3}$. In abundance occasionally in the Fens: not uncommon.

(H. guttatus, *Dahl.*, *Aubé.* Long. $3\frac{4}{5}$; larg. 2. Allied to both of the above species. Differs from H. fulvus, *Fab.*, by its longer form; thorax with a transverse line at posterior margin of very large, almost black, punctures: differs from H. mucronatus, *Steph.*, by smaller and more compressed head and eyes, and by the invariable presence of markings, which are more cloudy than those of H. fulvus, on the elytra. France.)

4. H. flavicollis, *Sturm*, *Aubé.* H. impressus, *Erich.*, *Steph. Illust.* H. ferrugineus, *Steph.*, *Bab.*, not *Linn.* Long. $4\frac{1}{5}$; larg. $2\frac{1}{5}$. Near London; Norfolk, Bottisham, Northampton; near Lincoln.

5. H. variegatus, *Sturm*, *Erich.*, *Aubé.* H. subnubilus, *Bab.* H. marginepunctatus, *Steph. Ill.*, not *Panz.* H. ruficollis, *Steph. Man.*, not *Degeer*, *Erich.* Long. $3\frac{1}{2}$; larg. $2\frac{1}{4}$. Cambridge, Huntingdon, Norfolk; not common near London.

6. H. cinereus, *Aubé*, *Erich.*, *Schiödte.* H. affinis, *Steph.* Long. $3\frac{1}{4}$; larg. 2. The disposition of the striæ on elytra is the same as in H. flavicollis, but the punctures are closer, smaller and more frequent in each stria; differs also by its smaller size, by the cloudy markings on elytra, and by the irregular punctuation of thorax; differs from H. ruficollis, *Dej.*, by the absence of striæ at the base of thorax, and by the markings on the elytra, which are always less distinct; it is also broader in form, with more parallel sides; more rounded at the apex than H. ruficollis.

7. H. ruficollis, *Deg.*, *Erich.*, *Steph. Illust.* H. impressus, *Gyll.*, *Aubé.* H. marginepunctatus, *Panz.* H. fulvicollis, *Steph. Man.* H. melanocephalus, *Steph. Illust.* H. brevis, *Steph.* H. rubicundus, *Bab.* Long. $2\frac{3}{4}$; larg. $1\frac{3}{4}$. Abundant.

8. H. fluviatilis, *Aubé*, *Erich.*, *Steph.* Long. 3; larg. $1\frac{4}{5}$. Dr. Schaum detected two examples in Mr. Wollaston's cabinet: it appears to be closely allied to H. ruficollis, *Dej.*, to be brighter in colour; the small lines on elytra which compose the transverse bands are never confluent; it is larger, longer and less dilated at the shoulders; it frequents rivers and running water, the former pools and stagnant ditches.

9. H. obliquus, *Fab.*, *Gyll.*, *Steph.*, *Aubé.* Long. $3\frac{1}{2}$—4; larg. $1\frac{3}{4}$—2. This well-marked species is local, but not uncommon.

(H. maritimus, *Fairmaire.* Long. $3\frac{1}{2}$. Colour and markings as

preceding, from which it is readily distinguished by its more dilated form, and a black transverse band at the base of thorax; the markings on elytra are somewhat differently arranged; apex less acute. Ostend; brackish water.)

10. H. confinis, *Steph.* H. lineatus, *Aubé*, *Erich.* Long. $3\frac{1}{4}$; larg. 2. Allied to, and often confounded with, H. obliquus; smaller, narrower, more obtuse; thorax with a small longitudinal stria on either side near the margin; the dark lines of the striæ of elytra are less interrupted, so that the markings on the elytra are less distinct and well defined.

11. H. lineatocollis, *Marsh*, *Gyll.*, *Steph.*, *Aubé.* H. bistriolatus, *Dufts.* Long. 3; larg. $1\frac{2}{3}$. The black anterior margin of thorax, and longitudinal line (which sometimes is an ill-defined cloud) along the centre of its disk, sufficiently point out this abundant species.

Genus Gyrinus.

1. G. marinus, *Gyll.*, *Ahr.*, *Erich.*, *Aubé.* G. natator, *Fab.*, not *Linn.* G. æneus, *Steph.*, not *Aubé.* G. æratus, *Steph.* G. dorsalis, *Gyll.*, var. Taken throughout Great Britain.

2. G. natator, *Linn.*, *Gyll.*, *Steph.* G. substriatus, *Steph.* Abundant.

(G. nitens, *Suff.* G. æneus, *Aubé.* Long. $5\frac{1}{2}$—7; larg. $3\frac{1}{2}$. Of the form, tint and punctuation of G. natator, from which it differs by the dark metallic colour of the lower part of the body, and also by the extremity of the elytra, of which the external angle is straight, not rounded: it is also allied to G. marinus, from which it is distinguished by its greater convexity, its colour more metallic and brilliant, and by the lines of points, of which those nearer the suture are less perceptible. Italy, Spain, middle of France; erroneously quoted as British.)

(G. distinctus, *Aubé*, *Fairmaire.* Long. $6\frac{3}{4}$; larg. $3\frac{1}{3}$. Head and thorax the same as G. natator; it differs by its form, more elongated, somewhat less convex, breast and last ventral segment piceo-ferruginous. The whole of Europe.)

3. G. minutus, *Fab.*, *Gyll.*, &c. Not common. Devonshire; near London; Netley; near Newcastle; water of Leith; near Edinburgh; Paisley: I took a fine series in a lake in Mull.

4. G. bicolor, *Payk.*, *Gyll.*, *Curt.*, *Steph.* G. angustatus, *Aubé.* Norfolk, Suffolk; Sheerness, in abundance; salt lakes in Devonshire.

5. G. urinator, *Illig.*, *Aubé.* G. lineatus, *Steph.* Slapton Ley: I have also received specimens from Mr. Bold, from Ouseburn.

Genus Orectochilus.

O. villosus, *Fab.*, *Gyll.*, *Steph.*, *Aubé*. G. Modeeri, *Marsh.*

I have thus endeavoured to place in their natural position, side by side with recognized British species, such foreign species of Hydrocantharidæ as have not yet been discovered here, but whose locality or latitude leads us to hope that they may eventually be added to our lists. At some future time I may be able to investigate in a similar manner the British and Continental species of the Philhydrida—a group equally interesting, but equally unknown.

Hamlet Clark.

Northampton, September, 1855.

Proceedings of Societies.

Entomological Society.

September 3, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Journal of the Society of Arts' for August; by the Society. 'The Literary Gazette' for August; by the Editor. 'The Athenæum' for August; by the Editor. 'Proceedings of the Royal Society,' Vol. vii., No. 14; by the Society. 'Revue et Magasin de Zoologie,' 1855, Nos. 1 and 7; by the Editor, M. Guèrin Méneville. 'Lettre addressée à M. Jacquelin du Val,' par M. H. Jekel, sur le Barypeithes rufipes (Extrait des Annales de la Soc. Ent. de France); by the Author. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., Part iv., Lepidoptera Heterocera; by the Author. 'Entomologische Zeitung,' May to August; by the Entomological Society of Stettin. 'Recueil d'Observations de Zoologie et d'Anatomie Comparée,' par Al. Humboldt et A. Bonpland, texte; presented by the President. 'Nouveau Genre de Carabiques, de la Tribu des Carabides;' 'Description de Seize Espèces de Longicorns du vieux Calabar, à la côte occidentale d'Afrique;' 'Description de Vingt et une Espèces Nouvelles de Coléopterès Longicorns;' all by the Author, Mons. A. Chevrolat. Twenty species of British Lepidoptera; by F. Bond, Esq.

Exhibitions.

Mr. Foxcroft sent from Perthshire some of his captures of Coleoptera, consisting chiefly of Brachelytra.

Mr. Douglas exhibited Elachista Brunnichiella bred from larvæ mining leaves of Clinopodium vulgare; Lithocolletis comparella, reared from a leaf of Lombardy Poplar, from Mickleham; and a pair of Gelechia maculiferella, taken *in cop.* on a window of his house at Lee.

Mr. Waring exhibited some remarkable varieties of Boarmia repandaria, Tephrosia

crepuscularia and Anticlea rubidata; all from the neighbourhood of Coomb Hurst, Croydon.

Mr. Edwin Shepherd exhibited a specimen of Leucania musculosa (L. nervosa, *Haw.*), captured near Brighton by Mr. J. N. Winter.

Mr. Westwood said that during a recent visit to Plymouth he had captured Aëpus marinus on the shore; and under some sea-weed he saw, but could not catch, a minute Dipteron, which he had little doubt belonged to the genus Clunio.

Mr. Westwood called the attention of the meeting to three new works by Dr. Burmeister, which he had just received. The first, intituled 'Uebersicht der Brasilianischen Mutillen,' a monograph of the Mutillidæ, would include, besides the species described by Dr. Klug in the 'Nova Acta,' all those discovered by Dr. Burmeister himself in Brazil. The second, 'Untersuchung über die Flügeltypen der Coleopteren,' treated of the venation of the wings in Coleoptera, an Order hitherto very partially investigated in this respect. The third, 'Kritische Bemerkungen über M. S. Merian's Metamorphoses Insectorum Surinamensuim,' which would be enriched in its progress by the author's researches into the natural history of insects made during his residence in Brazil.

The President said that during a recent tour on the Continent he had learned that the third volume of Professor Lacordaire's 'Suites á Buffon' was nearly ready; also that M. Candèze had collected a large amount of material for his monograph on the Elateridæ, and still hoped to receive from English entomologists the assistance he had asked, and that they were so well able to afford.

Mr. Haliday, at the request of the President, gave some account of the matters of entomological interest that had come under his notice during the Continental tour he had recently made in his company. That which had especially attracted his attention was an adaptation of a microscope to a camera obscura by Herr Weinnertz, of Crefeld, whereby the image of an object was thrown upwards on to a horizontal surface of glass, and a drawing on tracing-paper was made with great facility. For copying the venation of wings it was especially useful, and had been extensively employed by Herr Weinnertz; Mr. Haliday esteemed it a preferable and far more easy method than the camera lucida.—*J. W. D.*

Birds killed by Cold.—I have this year, for the first time in twenty years, missed the nightingale from my grounds. I generally have two nests at least, and three weeks' beautiful song; but this year I have had neither, and I should be glad to hear from your correspondents if they have had like misfortune, and if we are to attribute this loss to the cold weather. I did not observe any deaths among the swallows; but I think most of our tenderer birds suffered severely. I picked up a male and female bullfinch in my shrubbery at the point of death about pairing time.—*C. R. Bree; Stricklands, Stowmarket, September* 8, 1855.

Occurrence of the Bee-eater (Merops apiaster) *in the Isle of Wight.*—Lieutenant E. J. B. Edwards, of the Royal Engineers, shot in June last, at Weston, Freshwater, a splendid specimen of the bee-eater. This was communicated to me by Mr. Murrow, of the Royal Albion Hotel, Freshwater Gate, at whose house Lieutenant Edwards, was staying at the time, and who saw it in the flesh. I also saw the person who skinned it, viz. Mr. Rogers, bootmaker and naturalist, Freshwater, Isle of Wight.—*John Dutton; St. Peter's Place, Hammersmith, September* 15, 1855.

Disappearance of the Chough (Pyrrhocorax graculus) *from the Isle of Wight.*—These birds were formerly very plentiful in the Isle of Wight, building about the high cliffs from the Needles to the Freshwater Gate, but are now, it is supposed, reduced to a pair or two: the last known to be killed was caught in the rabbit-warren at Headon, Alum Bay, about two years since. They used to be as common as other crows: a man named Long told me he once killed five at a shot. A family named Lea were nearly poisoned by eating them twenty years since: this was told me by Lea himself (a coast-guard man), who partook of them.—*Id.*

White Swallow.—Last evening I saw a swallow flying over my garden that appeared to be pure white all over. I could not see any other colour whatever.—*Henry Doubleday; Epping, August* 20, 1855.

Occurrence of Crossbills in Northumberland and Durham.—During the summer a great many crossbills (*Loxia curvirostra*, Linn.), have visited our district: they were in the greatest numbers during August, and were generally in parties of six or seven. A friend of mine, who shot a good many of them, is of opinion that they had been bred here, as they were in such plumage as to render their coming from a distance very improbable.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, September* 4, 1855.

On the Doubled-broodedness of Gonepteryx Rhamni.—Although I am not the Mr. Bree who has raised this point for discussion, I have a word or two to say on the subject. I think Mr. Douglas is hasty in his remarks about the want of practical knowledge in the Rev. Mr. Bree's observations. It is a very fair inference, and one very generally drawn by "practical entomologists," that insects appearing in early spring in a wasted condition have hybernated, and *vice versa*, those that are fresh have recently emerged from their pupa stage of existence. A sound inference is as valuable as a known fact; if not Bacon has lived in vain, and the inductive process of reasoning is false. Mr. Douglas proves nothing by his fact, except what was very well known, that the larvæ of the first brood of G. Rhamni are full-grown in June. I *know* that this takes place with other insects, in which the larvæ produce a second brood in the autumn, and I will state a case in point. The first warm, sunny day in May I can always take in one locality in this neighbourhood many specimens of Speranza conspicuaria quite fresh, with their wings covered with those delicate frosty, silvered atoms which impart such beauty to this insect. I *infer* that it has not hybernated, *inter alia*, from its freshness; and my grounds for this inference are—firstly, the broom, upon which the larvæ feed, grows on an exposed hill, far removed from any house or place of shelter; and secondly, if the insect has hybernated, it must have been covered with three or four feet of snow once or perhaps twice in the winter, and consequently exposed to the drenching thaw which succeeds. I have taken it, in different years, upon the 7th and 29th of May and beginning of June, and it is found for about fourteen days, more or less, when it disappears, and the larvæ may be found full grown in the beginning of July. In the beginning of August the second brood appears more numerous than the first, and disappears in about the same time—about fourteen days; the larvæ become full-grown in the late autumn, and pass the winter as pupa—to emerge as perfect insects the following May. Now, knowing this to be true, have I not a right to infer that exactly the same process takes place with G. Rhamni, and that it is equally "double-brooded." I have the greatest possible respect for the

opinion of that excellent entomologist, Mr. Doubleday; he has often—very often—been of the greatest possible assistance to me in my entomological pursuits, and it is with much diffidence that I suggest any views in opposition to his, but he will I am sure be glad to have a subject like this publicly discussed. Do insects which hybernate disappear directly they emerge from the pupæ state in autumn, *if the weather is warm?* Or do they only do so upon the approach of winter? I saw and took G. Rhamni this day, September 10. Does the intercourse between the sexes, according to the single-brood theory, take place before or after hybernation? If before, the insect would not look fresh in spring, as it is this process which disturbs the nuptial bloom of insects more than anything else. Depend upon it that hybernation of the imago is an accidental or casual occurrence. It is opposed to the whole scheme of insect life.—*C. R. Bree; Stricklands, Stowmarket, September* 10, 1855.

Is Gonepteryx Rhamni double-brooded?—I have read with much interest the several remarks of Mr. Newman (Zool. 4706), Mr. Doubleday (Id. 4811) and Mr. Douglas (Id. 4812), on the question whether G. Rhamni be double-brooded or not. I entirely coincide in the opinion expressed by them, that it is *not*. If the insect be double-brooded (in the exact meaning of that term), there ought to be *three* "flights" of the insect, it being admitted on all hands that it is seen on the wing in April, or earlier if the season be favourable, and again in the autumn. The first, or, as it may be termed, the midsummer brood, would be produced from eggs laid by the parent insect in April, or earlier, as the case may be. Supposing Rhamnus catharticus to bud about the beginning of May, the larva, by rapid eating, *might* become a pupa at the end of the month, and, by an equally rapid proceeding, *might* become an imago by the middle of June. Let us then turn to *facts*. Has any entomologist ever seen G. Rhamni, fine or otherwise, on the wing, either in June or July? It would be presumptuous in me, on my own individual authority, to deny positively that it has been so seen; but I have collected in Yorkshire, Gloucestershire, Buckinghamshire and Suffolk, and I can confidently affirm, that, as far as my acquaintance with those counties extends, G. Rhamni has never been on the wing in June or July. It lies with the advocates of "double-brooded" to show that it has not only been seen, but seen in *fine condition* during those months. If their proof in this respect fail, the question, as it appears to me, is set at rest. Mr. Stainton asks, "Do not the hybernated females lay eggs in the spring? do not these eggs produce larvæ which feed up in May, and furnish the perfect insect in June? &c.," and adds, "I pause for an answer to these inquiries." He has *my* answer, that *I* never saw the insect on the wing in the month of *June*, though I do not deny that others may. With regard to the circumstance so strenuously urged, and apparently so confidently relied upon, by Mr. Bree and Mr. Hawker, that *fine* specimens are seen in April or earlier, what has this to say to the question, "single or double-brooded?" Do they call these the *first* brood? Brilliant specimens *may* be taken in the spring; but, though I have captured dozens, and seen hundreds on the wing at that season, I have never been fortunate enough to take one worth placing in my cabinet. Conceding the fact, however, nothing can more easily be accounted for. As Mr. Doubleday truly remarks, numbers become quiescent very soon after they have emerged from the pupa state, and appear in spring almost as fresh as when first hatched. In corroboration of this, I may mention the following fact:—Walking out about a fortnight since, I saw a number of pupæ of Vanessa Urticæ, and took home about a dozen: on the 27th of last month one of them produced the insect, about six o'clock in the evening: that night there was a pretty sharp frost, and the insect became apparently torpid: from that date, up to the

present moment, it has never stirred, and, when pushed, merely moves a leg: as the sun never shines on the place where it is, I have no doubt it will remain quiescent until next spring. Now, if an insect, immediately after emerging from the pupa, could thus become torpid, even in a *room*, how much more so when exposed to the open air. In conclusion, I have only to state my firm conviction that there is but *one* brood of G. Rhamni in the year.—*Joseph Greene; Brandeston, Woodbridge, Suffolk, September* 5, 1855.

Note on Argynnis Lathonia.—Seeing we are making sundry investigations relative to certain of the Rhopalocera, A. Lathonia amongst the number, I have a question to ask, and I believe in doing so I am stating the wishes of many of my brethren. It is this, that each party who possesses a specimen or specimens of this insect would kindly forward a notice to the 'Zoologist,' stating when he captured them, where they were captured, or how they came into his possession. There has been, it is currently reported, a "job" lot, as the merchants say, distributed amongst various individuals, and which have no more claim to be British than I have to a benefice: their repinning allows them to be easily "seen through," and the flattening out of the abdominal groove also proves them to be an admirable "gull."—*John Scott; South Stockton, September* 7, 1855.

Note on the Breeding of Notodonta dictæoides, &c.—Having heard frequent complaints from entomologists of the difficulty of breeding this beautiful prominent, I beg to make known a method I have tried, and which has proved very successful. It is as follows:—I procured a large flower-pot, and cut it in two, and cut a round hole in a square piece of wood, so as to fit tight round the upper part of the bottom half of the pot. This forms the bottom of my cage, which is made of thin slips of wood about nine inches high, and covered over (including the top) with book-muslin. In light cages of this kind, there is no difficulty in feeding up larva, provided they are kept supplied with fresh food. I fill the pot with fine mould, mixed with rotten wood, from the root of the aspens at Wanstead, leaving a few leaves on the top. When the larvæ have gone down, I take the pot out, and put it in a large cage in my garden, where it stands winter and summer. This last-mentioned cage is of sufficient size to hold four or five pots, is made of wood with painted lines in the sides, back and front, and a slanting wood and fine wire top, which admits of a free circulation of air, and prevents mould. In cages on this plan I have bred all my N. dictæoides that went down last season (ten in number), twenty-seven Asteris, twenty-three Flavicornis, and many other insects.—*William Machin;* 35, *William Street, Globe Fields, Mile End, September* 3, 1855.

Capture of Scolytus destructor in the North of England.—When at Gibside, in the latter end of August last, I was not a little surprised to find seven specimens of Scolytus destructor, in the bark of a felled elm-tree. They were accompanied by numbers of larvæ, in all stages of growth. Whether this was a colony recently founded, or the pest a denizen of our woods, is a question for future observers to determine.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, September* 6, 1855.

The Vinegar Polype.—The French missionaries, Huc and Gabet, seem, from their interesting narrative of a journey through Thibet and China, to have been more skilled in the knowledge of men than of the animal or vegetable world. When in the Province of Kiang-si, three hundred miles from the sea, they describe the want of vine-

gar to quench their thirst as having been supplied by polyp, the properties of which, they say, were not new to them. "At a guard-house near Nan-tchang-fou, we asked for some vinegar. 'I have some,' said the mandarin; 'it is polypus vinegar, made by the animal itself.' This Tsou-no-dze (vinegar polypus) is a creature that, on account of its extraordinary property of making excellent vinegar, merits particular mention. It is a monstrous assemblage of fleshy and glutinous membranes, tubes, and shapeless appendages, that give it a very ugly and repulsive appearance; you would take it for an inert, dead mass, but when touched it contracts and dilates, and assumes various forms. It is an animal whose structure and character are not better known that that of the other polypi. This Tsou-no-dze is found in the Yellow Sea, and the Chinese fish for it on the coasts of Leao-tong, but it is rather scarce. Possibly it may be more abundant in some other places, where it is neglected from ignorance of its peculiar property. This polyp is placed in a large vessel filled with fresh water, to which a few glasses of spirits are added, and after twenty or thirty days this liquid is found transformed into excellent vinegar, without going through any other process, and without the addition of the smallest ingredient. The vinegar is as clear as spring water, very strong, and of a very agreeable taste. After the first transformation, the source appears inexhaustible, for as it is drawn off by degrees for consumption it is only necessary to add an equal quantity of pure water, without any more spirit, and the vinegar remains equally good. The Tsou-no-dze, like the other polypi, is easily propagated by germination; you detach a limb, which vegetates and grows, and in a short time is found to possess the same property of changing water into vinegar. These details are not only based on the best information we have been able to collect, but we ourselves possessed one of these polypi, and kept it for a year, using constantly the delicious vinegar which it distilled for us. At our departure for Thibet, we presented it to the Christians of our mission in the Valley of Black Waters." Can this marvellous animal, said to be fished up in the Yellow Sea, be anything else than the repulsive-looking mass, answering to Huc's description of the Tsou-no-dze, which is found in certain states of acetous fermentation, distinct from the mould that occasionally gathers on the surface, and which in the North of England is called "the mother," in vinegar, &c., as supposed to concentrate all the acid? Whether it is now as productive of agreeable vinegar as the missionary represents his polyp, I am not prepared to assert.—*Charles Fox; Trebah, Falmouth.*

NOTICES OF NEW BOOKS.

'*Annals and Magazine of Natural History.*' No. 93, dated September, 1855; *price* 2*s.* 6*d.* London: Taylor and Francis, Red Lion Court, Fleet Street.

The following are the contents:—

'Observations on the Genera Pachybdella, *Diesing*, and Peltogaster, *Rathke*, two animal forms parasitic upon the abdomen of Crabs.' By Professer Steenstrup. [Extracted from Weigmann's Archiv, 1855, p. 15.]

'Notes on Palæozoic Bivalved Entomostraca. No. II. Some British and Foreign Species of Beyrichia.' By T. Rupert Jones, F.G.S.

'On the Heart and Circulation in the Pycnogonidæ.' By Dr. A. Krohn. [Extracted from Weigmann's Archiv for 1855, p. 6.]

'Abstract of a Monograph of the Family Gorgonidæ.' By M. Valenciennes.

'On the Genus Assiminia.' By Dr. J. E. Gray, F.R.S., V.P.Z.S.

'On the Law which has regulated the Introduction of New Species.' By Alfred R. Wallace, F.R.G.S.

'On some New Species of Hemipedina from the Oolites.' By Thomas Wright, M.D., F.R.S.E.

'Short Biographical Notice of the late Dr. Johnston, of Berwick-upon-Tweed.

Bibliographical Notice:—'The British Flora, comprising the Phænogamous or Flowering Plants, and the Ferns.' The 7th edition, with additions and corrections. By Sir William Jackson Hooker, K.H., D.C.L., &c., and George A. Walker Arnott, LL.D., &c.

Proceedings of Societies:—Royal, Linnæan, Botanical of Edinburgh, Zoological.

Miscellaneous:—Monstrosity of Antirrhinum majus; by Dr. J. E. Gray. Notice on the Horns and Skull of the Arnee; by Dr. J. E. Gray.

In the Proceedings of the Royal Society occurs the report of a paper by Dr. John Davey, intituled 'Some Observations on the Ova of the Salmon in relation to the Distribution of Species.' In this the Doctor gives the result of experiments on ova submitted to various tests, with a view to elucidate the geographical distribution of fishes. The conclusions drawn from the observations are as follows:—

"1. That the ova of the salmon in their advanced stage can be exposed only for a short time to the air if dry, at ordinary temperatures, without loss of life; but for a considerable time, if the temperature be low, and if the air be moist; the limit in the former case not having exceeded an hour, while in the latter it has exceeded many hours.

"2. That the vitality of the ova was as well preserved in air saturated with moisture as it would have been had they been in water.

"3. That the ova may be included in ice without loss of vitality, provided the temperature is not so low as to freeze them.

"4. That the ova, and also the fry recently produced, can bear for some time a temperature of about 80° or 82° in water, without materially suffering; but not without loss of life, if raised above 84° or 85°.

"5. That the ova and young fry are speedily killed by a solution of common salt nearly of the specific gravity of sea-water, viz. 1026; and also by a weaker solution of specific gravity 1016.

"Finally, in reference to the inquiry regarding the distribution of

the species of fishes, he expresses his belief that some of the results may be of useful application, especially those given in the second and third sections; inferring, that as in moist air, the vitality of the ova is capable of being long sustained, they may, during rain or fog, be conveyed from one river or lake to another, adhering to some part of an animal, such as a heron or otter, and also during a time of snow or frost; and further, that other of the results may be useful towards determining the fittest age of ova for transport for the purpose of stocking rivers, and likewise as a help to explain the habitats, and some of the habits of the migratory species."

The following note by Mr. Hogg on the fish lately stranded in Tees Bay is from the Proceedings of the Linnean Society:—

"Since my return home, I have had an opportunity of learning more particularly respecting the large fish which was stranded last September in the Tees Bay; and I have now not the least doubt that it was a common tunny, and that too of a large size. One of the fishermen who had seen the fish, on cutting it said—the flesh looked like highly-salted bacon, *i.e.* red with salt or saltpetre. He described it in size as 'being pretty well on to 60 stone,' which, at 8 lbs. to the stone (meat weight), would give 480 lbs. The only freshly-killed tunny I ever saw was at Palermo; it was a good-sized fish, and was carried on the shoulders of two strong fishermen, the one walking a few feet before the other. Pennant describes, in his 'Brit. Zool.' (edit. 1812), vol. iii. p. 362, one which was caught at Inverary in 1769 as weighing 460 lbs. This then would probably be somewhat less than the Tees fish; and this is further shown by the following fact:—Pennant says the tail 'measured 2 feet 7 inches between tip and tip' of its crescent-form. I yesterday measured the tail of the Tees fish, which gave 2 feet $8\frac{1}{4}$ inches from tip to tip, thus having $1\frac{1}{4}$ inch more in the width of the crescent-tail than Pennant's, and consequently most likely it was the larger of the two. The fisherman had well preserved the tail, and it presents a beautiful specimen of a crescent, and very perfect, each half corresponding in a very accurate manner with the other. It is covered with a thick, nearly black skin, and quite smooth. I counted the caudal rays, and at first I made nineteen on one side and eighteen on the other; but on recounting them I am more satisfied that they are equal, *i.e.* eighteen on each side or in each half. Between them I noticed most distinctly 'a cartilaginous keel between the sides of the tail,' as described by Cuvier in his generic characters of his genus Thynnus."

'*Catalogue of British Hymenoptera in the Collection of the British Museum.*' By FREDERICK SMITH, M.E.S. Part I. Apidæ—Bees. London: Printed by order of the Trustees. 1855. 248 pp. 12mo, 10 plates: price 6*s.*

OUR readers will doubtless recollect Mr. Smith's admirable papers on British Bees which appeared from time to time in the pages of the 'Zoologist.' There was a comprehensiveness of thought, a mastery of the subject, and a lucidity of arrangement about them, which at once raised the author to the very highest rank as an entomological writer, and which rendered the students of our bees the greatest possible assistance. To myself these papers were of peculiar value and interest, inasmuch as for several years I had paid almost exclusive attention to this somewhat neglected tribe; and with Kirby for my guide I had succeeded in identifying a large proportion of our species. Admirable, however, as are the descriptions of the 'Monographia,' I could not resist the conviction that a more intimate knowledge of the living insects would have induced the learned author to associate, under one specific name, bees which appeared to me to differ only in sex or in the still less satisfactory character of age. Mr. Smith did everything I desired, associating sexes and varieties, with a judgment that struck me as little less than miraculous. From that time to the present Mr. Smith has directed great attention and much time to perfecting his knowledge of the tribe, until his researches have culminated in the production of a volume which must unquestionably be pronounced the best entomological monograph in the British language. This is saying a great deal, when we bear in mind the labours of Kirby, Shuckard, Denny, Stainton and others; but it is the peculiar charm of Mr. Smith's writings that he always carries conviction to the mind that he is perfectly acquainted with the subject on which he is writing. Other authors appear to do the best that can be done "considering the obscurity of the subject,"—"considering the paucity of materials,"—"considering the erroneous statements of previous writers, and the utter worthlessness of their labours:" Mr. Smith needs no such apologetic qualifications: no man living surpasses him in his knowledge of the subject, and no one has hitherto surpassed him in making that knowledge available to others.

A debt of gratitude is also due to Dr. Gray for the zeal and energy he has displayed in the publication of such works as these; for although this may possibly be the only one of the series properly

entitled to be considered a perfect monograph, yet the others are of incalculable value to the student, and now form a key to the knowledge of the animal world. I believe the whole of them are issued at the mere cost of printing and paper, in order that naturalists may derive the greatest possible amount of benefit from their publication.

In support of my unqualified commendation of Mr. Smith's volume I proceed to make a copious extract, which I trust will be read by others with the same pleasure that it has given me, premising, however, that I purpose returning again to these bees, and giving a somewhat more systematic account of their methodical arrangement, and adding to Mr. Smith's labours a running accompaniment of my own. The passage relates to the species of Andrena.

"These bees are subject to the attacks of parasites: the first to be remarked upon are those bees which compose the genus Nomada; they are more popularly known as wasp-bees, since they bear a considerable resemblance to some of the small solitary species of that family. These parasites appear to be upon a perfectly friendly footing with the industrious bees, and are permitted, without let or hindrance, to enter their burrows. It has been advanced as a proof of the ingenuity and artifice necessary to be employed in effecting the deposit of their eggs in the working bees' nests, that the parasites should bear a close resemblance to the bees upon which they are parasitic: some instances may undoubtedly be advanced, as Apathus and Bombus, and also in the different species of Volucella which infest the nests of humble-bees, but amongst the solitary bees no such resemblance is required to aid in any necessary deception. It may be remarked that the two cases are not analogous: this is true; and I am not prepared to say that in the case of the Bombi and their enemies it may not be necessary, but as regards solitary bees it certainly is not;—colonies of Andrenidæ and their parasites mingle together in perfect harmony, issuing from and entering into the burrows indiscriminately. I have on several occasions watched with much enjoyment a large colony of Eucera longicornis, the males occasionally darting forwards with great velocity, then turning sharply round, and as it were swimming in circles close to the ground, then darting off again and again in an unceasing round of sportive enjoyment; their industrious partners, whose whole existence appears to be bound up in one unceasing round of labour, would occasionally return home laden with food for their young progeny. Sometimes it would happen that a Nomada had previously entered her nest; when such proved to be the case, she would issue from it, and, flying off to a short distance,

wait patiently till the parasite came forth, when she would re-enter and deposit her burden. It will be observed, in this instance, that between Eucera and Nomada no resemblance exists in general appearance, one being several times larger than the other, and covered with pubescence of a sombre colour; whereas the parasite is a gaily coloured insect, destitute of pubescence, and readily observed from the brightness of its colouring. To some extent, I have observed that a constant connexion between certain species exists, and I have never met with some species of these parasites except in connexion with certain species of Andrena; but there are others, as Nomada ruficornis, succincta, alternata, and Lathburiana, which infest the nests of several species of Andrena indiscriminately; the species are, A. tibialis, Trimmerana, Afzeliella, and fulva; but the following I have never observed, except connected as follows: Nomada lateralis and A. longipes, N. baccata and A. argentata, N. borealis and A. Clarkella, N. germanica and A. fulvescens, and lastly, N. sexfasciata and Eucera longicornis. Much further investigation is still necessary before we can arrive at a knowledge of the real nature of the connexion which exists between the bees and their parasites. It has been supposed that the parasitic larva is hatched sooner than that of the rightful owner of the nest, and that it consequently consumes the food, and leaves the larva of the bee to perish; but to this I do not assent: it appears so contrary to all natural laws, that I cannot think it even probable: nature I have never observed to be thus wasteful of animal life—such a proceeding is unnecessary, and therefore unlikely: where a destruction of animal life is observed, it can usually be traced to some reasonable cause, as the destruction of the larvæ of certain Lepidoptera, being a check upon their superabundance: a parallel to this does not appear to me to exist in the case of the bees: I am more inclined to believe that when the parasite has deposited her egg upon the store of pollen, the industrious bee at once deserts it, and proceeds to construct a fresh burrow; and that the parasites which may be observed constantly entering different burrows, do so in order that they may find the requisite quantity of food, which will usually be much less than that required for the industrious bee; having found which, they deposit their egg, and the nest is then possibly deserted by its legitimate owner.

"The Andrenidæ are also subject to the attacks of other enemies, if so they can be called; we have seen that in the first place their food is attacked by Nomadæ; we are now to find their larvæ attacked by insects belonging to the Order Coleoptera; these belong to the

genus Stylops, which several distinguished entomologists of the present day agree in placing among the Heteromerous parasitic beetles. These insects were placed in a new order by Mr. Kirby, named Strepsiptera, and as such they are still regarded by many entomologists; we have at present only to do with them as enemies to the bees, and briefly to narrate the manner in which the latter are attacked by them. These insects are diminutive in size, the largest known species not exceeding a quarter of an inch in length; we are now speaking of the winged males; the females are apterous grub-like insects, which never leave the bodies of the bees. If the abdomens of a number of Andrenidæ be examined, it is most probable that the female of Stylops will be found; her presence is known by the protrusion of her head and a portion of the thorax between the abdominal segments on their superior surface, resembling the point of a small bud of a brown colour, or rather a flattened scale. I have several times bred the larvæ of Stylops in the following manner: on finding a bee infested as described, place her in a box 5 or 6 inches square, cover it with gauze, and supply the bee with fresh flowers, such as the Andrenidæ frequent; examine the bee every day, and it is most likely that in eight or ten days she will appear as if her abdomen was covered with dust; examine it, and in all probability she will be found to be covered with an innumerable quantity of exceedingly minute animals; these are the larvæ of Stylops; by the aid of a magnifying-glass they may be seen to issue from the transverse aperture on the thorax: when the bee re-enters the cell, or settles upon flowers, these diminutive creatures will of course occasionally be deposited, and by these means, when other bees visit the flowers, they attach themselves to them and are carried to their nests. Judging from the multitude of larvæ produced by each female Stylops, amounting to many hundreds in each case, and the rarity of the perfect insect, the majority must perish, probably in the larval condition. From the fact of seldom more than two Stylops being found to infest the same bee, we may suppose that to be the largest number which infests one larva of an Andrena; they undergo their changes in the body of the bee, the male on its final transformation becoming an active winged insect, the female remaining a mere apod, attached for life to the bee which nourished it. A most complete and interesting summary of the observations of entomologists on these parasites will be found in the twentieth volume of the 'Transactions of the Linnean Society,' by Mr. George Newport, who has in this paper entered most minutely into the anatomy, functions and development of these remarkable parasites, being the most interesting and complete essay on the subject yet written.

"There are still other parasites to be noticed, which will occasionally be found on the bodies of these bees; the first to be noticed is a small orange-coloured Pediculus, which is about one-tenth of an inch in length; this is the larva of Meloë; I have several times reared these hexapods from the eggs of that beetle. For the most complete account of their history reference must be made to the twentieth volume of the 'Linnean Transactions,' which contains Mr. George Newport's most interesting memoir on Meloë cicatricosus; in this paper it is shown that the larva of the beetle feeds on that of Anthophora pilipes; but it remains to be proved that the larva of an Andrena can serve as food for the larva of a Meloë: I am inclined to think this can never be the case, and that the fact of our finding them on these bees is a mere indication of the usual habit of the larvæ in attaching themselves to any insect which comes in their way, for we as constantly find them on Diptera and flower-visiting Coleoptera as upon the Andrenidæ:—it has been shown that a larva of Anthophora will nourish that of Meloë, but so small a larva as that of Andrena can, I think, scarcely answer that purpose; I have however included them, but merely as supposed parasites on Andrena.

"We now come to the last supposed parasite on these bees; it is found on their bodies, and exactly resembles in form the last-mentioned, but is of a brown-black colour, and is full twice the size; they attach themselves to the hairy parts of the bees, as the metathorax, and the sides of the thorax beneath the wings. What these pediculi really are is at present involved in complete obscurity; Mr. Kirby regarded them as insects in their perfect condition, naming them Pediculus Melittæ. I have frequently observed these creatures in considerable numbers in the flowers of Ranunculus acris, as many as twenty or more in a single flower, about the month of April; and I think always before the usual time for meeting with the larvæ of Meloë. I have found them on various species of bees, usually on those which are most pubescent, as Andrena fulva, thoracica, and nigroænea; also commonly on Melecta armata, Anthophora retusa and pilipes: this circumstance would appear to confirm, or indicate a connexion between the insects, and from analogy we might readily conclude that this Pediculus must be a parasite on some species of bee; but we have nothing in support of this supposition, and against it we have the following observations:—Mr. Newport has shown that it cannot be the larva of Meloë cicatricosus, and, as well as myself, has proved that it cannot be that of M. violaceus or of M. Proscarabæus; and since the only other species of Meloë, the M. variegatus, does

not occur near London, it appears certain that it cannot be the larva of any species of that genus, unless it be discovered hereafter that the larva of Meloë not only increases in size in its hexapod state, but that it also changes from bright orange to black.

"Another circumstance which induces me to hesitate in adopting an opinion of the Pediculus being a larva at all, is the fact, that on opening some cells of Anthophora retusa, which I dug up on Hampstead Heath, I found two living specimens of the hexapod in the same cell as the perfect bee; it is certainly possible that they might have subsisted on a portion of the food laid up by Anthophora; but here was no change of condition, and how came they into the cell? I am inclined to think that they, being insects in their perfect condition, came there exactly in the same way as we find Forficulæ, having forced an entrance, which I did not observe, and that they were in quest of food, seeking what they might devour."—P. 45.

'*The Natural History Review.*' No. VII., dated July, 1855; *price* 2*s.* 6*d.* London: Highley.

The following papers, read before Irish Societies, appear in the present number:—

'The Fjords of Norway and other similar Coasts.' By J. J. Murphy.

'Native Zoophytes.' By W. Thompson, Esq., LL.D.

'Notes on the Effects of the late Frost.' By Mr. Robertson.

'On the Occurrence of the Iceland Gull.' By Dr. Creighton.

'Notes on the South-West Coast, and on the Occurrence of the Greater Shearwater (*Puffinus major*).' By W. Andrews, Esq.

'Notes on the Occurrence of Ianthina communis and Spirula Peronii.' By Mr. Hopkins.

'On the Remains of Animals at Dunshaughlin.' By Mr. Wakeman.

'On the Habits and Varieties of some of the Laridæ.' By Mr. Watters.

'Notes on the Diurnal Lepidoptera, and on the Sphingidæ of some portion of Worcestershire.' By J. W. Lea, Esq.

'On Rearing Lepidoptera from the Pupa state, together with Notes on the Management of the Larvæ and Pupæ of Micro-Lepidoptera.' By Mr. Shield.

'List of Irish Micro-Lepidoptera.' By A. R. Hogan, Esq.

'Remarks on some rare British Insects.' By J. C. Dale, Esq., F.L.S.

'Entomological Remarks.' By A. H. Haliday, Esq., A.M.

Besides these contributions to science we cordially commend to the notice of entomological readers the able review with which the number commences: it is intituled 'Recent Works on the Diptera of Northern Europe,' and is very evidently from the pen of that eminent Dipterist, Mr. Haliday.

Mr. Haliday's 'Entomological Remarks' contains useful information. On the shore of the creek of Owenbeg river, within a space of a few yards square, he found the following maritime Coleoptera, besides others of less note:—Bradycellus pubescens, Pogonus chalceus, Bembidium laterale, Aëpus Robinii, Micralymma marinum and Heterocerus Marshami. It is remarkable that of this list only the first was known to Mr. Clear as a native of the county Cork. Mr. Haliday had never before seen them all associated. The Aëpus, which occurs also near Passage, appears to be confined to those parts of the coast, below high-water mark, where clay comes to the surface. Specimens from Scotland, the gift of Mr. Javet, were exhibited, also Aëpus marinus from Strangford. Mr. Haliday was disposed to doubt the importance of the distinctions assigned to the two alleged species, Robinii and marinus. The difference in the armour of the feet led him to suspect that a sexual distinction may have been treated as specific. He quoted the remarks under Ptilium pallidum in the 'Faune Françoise' of Fairmaire and Laboulbène: "Les angles posterieurs du corselet varient un peu, et il est facile, avec de la bonne volonté, de trouver des angles 'très obtus' et des angles 'près que droits;' mais selon nous ces deux termes sont fort exagérés." Agreeing with Mr. Haliday in the unsatisfactory nature of the diagnostics on which the species Robinii is founded, yet we cannot suppose with him that a sexual has been taken for a specific difference, seeing that from the three great stations of marinus, Devonshire, Queensferry and Strangford, not a single example of Robinii has been recorded; surely the sexes are not geographically separated. Mr. Haliday found at Blarney Lake last summer some specimens of Phytobius velatus, of which he possessed before but a single specimen, taken at Holywood. These were partly taken out of the water, partly swept off the stems of Equisetum, when the sun was shining strong. Beck, the discoverer of this species, has remarked that it swims fast and dives. The peculiar natatorial character of the legs was pointed out, being thinly furnished with long hairs, the tarsi without the broad felt-like sole usual in the family, and with scarcely any enlargement or notch of the penultimate joint, but with long claws like those of Elmis, &c., by which it clings to the submerged plants, Myriophyllum,

Zannichellia, &c., among which are its haunts. A second species, Phytobius leucogaster, of which also specimens were exhibited, and which was taken by Mr. Haliday at Holywood, has the like structure in some degree, and the two have been separated from Phytobius by Redtenbacher, as the genus Litodactylus, but, as Suffrian has remarked, there is considerable difference between these two species, while a third, P. velatus, has the aquatic character much more marked than either.

'*Quarterly Journal of Microscopical Science, including the Transactions of the Microscopical Society of Landon.*' Edited by Edwin Lankester, M.D., F.R.S., F.L.S., and George Busk, F.R.C.S.E., F.R.S., F.L.S. London: Highley. No. XI., dated April. 110 pp. demy 8vo. letter-press and 2 plates; *price* 4*s*.

Although not bearing a "Natural-History" title this periodical has strong claims to be regarded as an emanation from our science. It is a kind of compound of the late Mr. Cooper's 'Microscopic Journal' and the admirable 'Transactions of the Microscopical Society.' Its contents will be given in future numbers of the 'Zoologist,' with a view to making it known among a larger body of naturalists than are at present aware of its existence. The contents of the present number are as under:—

'On the Development of Purpura Lapillus.' By William B. Carpenter, M.D., F.R.S., F.G.S., President of the Microscopical Society.

'On the Occurrence among the Infusoria of peculiar Organs resembling Thread-cells.' By George J. Allman, M.D., F.R.S.

'Snow Crystals in 1855.' By James Glaisher, F.R.S.

'An Investigation into the Structure of the Torbanehill Mineral, and of various kinds of Coal.' By John Hughes Bennett, M.D. F.R.S.E. [Extracted from the 'Transactions of the Royal Society of Edinburgh.']

'Observations on Noctiluca (miliaris ?).' By Dr. W. Busch. [Translated from 'Beobachtung. üb. Anat. u. Entwickl. einiger wirbellosen Seethiere,' p. 103. Berlin, 1851.]

'Researches on the Development of the Microscopic Algæ and Fungi.' By Dr. T. Cohn. [Translated from the German.]

Reviews:—'Principles of Comparative Physiology;' by W. B. Carpenter, M.D., F.R.S. 'The Microscope, and its application to Vegetable Anatomy and Physiology;' by Dr. Hermann Schacht;

edited by Frederick Curry, M.A. 'Lettsonian Lectures on Pulmonary Consumption;' by Theophilus Thompson, M.D., F.R.S.

Notes and Correspondence:—Feet and Wings of Insects; by Mr. John Tyrrell. The Markings of the Pleurostigmy, &c.; by Mr. G. Hunt. Definition of Delicate Test Objects; Anon. Cheap Microscopes. Cilia in Diatomaceæ; by Mr. J. Hogg. New Mode of Illumination; by Dr. Wright. On the Aperture of Object-glasses; by Mr. J. D. Sollitt. On Washing and Concentrating Diatomaceæ; by Dr. Munro. On Camphylodiscus Clypeus; by Mr. R. Wigham. Cilia on the surface of Confervæ; by Dr. Kingsley. On an Easy Method of Wiping thin Glass Covers; by William Hodgson. Metallic Impressions of Microscopic Objects; by Mr. Wenham. Note on Dr. Griffiths' paper on Angular Apertures; by the Editors.

Proceedings of Societies:—Microscopic, Royal.

Zoophytology.

'*A Manual of Marine Zoology for the British Isles.*' By Philip Henry Gosse, A.L.S. Part I. London: Van Voorst. 1855. 203 pp. 12mo, 335 figures in wood. Price 7s. 6d.

The author's preface will thoroughly explain the object and scope of this little work. I have great pleasure in giving it entire. Mr. Gosse has certainly followed out his programme most usefully, although perhaps imperfectly, and we gladly accept this little summary of sea-side lore as an unassuming travelling companion that will always be in our pocket when we visit the coasts of our sea-girt isle. "*Imperfectly!*" Of course we must explain our meaning: Mr. Gosse is not always at home in his subject, and is compelled to seek information from scattered and sometimes rather obscure sources: thus, he tells us "Of the hundreds of thousands of insects known to exist but two live in the sea." The entomological reader will be surprised to hear that these two are Aëpus marinus and Microlymma brevipenne. These are land, not marine insects, and are only submerged at certain states of the tide, just in the same way as Aëpus Robinii, Broscus cephalotes and a host of others, but the truly marine and highly interesting Macroplea Zosteræ is entirely omitted. Now those who have read Mr. Gosse's capital account of Zostera marina, the food-plant of Macroplea, will not suppose him unacquainted with the beetle, but may infer that he did not know its name, or, more strange still, was not aware that it was a true insect. Doubtless

Mr. Gosse is better informed on most branches of the subject than on this; indeed, his published labours on the sea-coast convince us that he is so, and we cordially welcome the little book as a cheap and useful assistant to those sea-side visitors whose mental energies are unsatisfied with crochet and the last new novel.

"It is now about four-and-twenty years ago, that, in a land far remote from this, I began the study of systematic Zoology, with insects. It is, beyond all comparison, the most extensive class of animals, in fact all but boundless; but in my ignorance I attacked it entire and indivisible, collecting and trying hard to identify everything that I found, from the Cicindela to the Podura. I had not an atom of assistance towards the identification, but the brief, highly condensed and technical generic characters of Linnæus's 'Systema Naturæ,' over which I puzzled my brains, specimens in hand, many an hour. Of course there was much darkness, there were many egregious blunders; but perseverance did a good deal, and I have never regretted the time spent in that exercise. The leading forms of that great class were familiarized to me in a way that they never would have been if I had merely learned their names from coloured engravings, or from the oral information of some more learned friend; and what was of far greater value, I acquired the habit of comparing structure with structure, of marking minute differences of form, and became in some measure accustomed to that precision of language, without which descriptive Natural History could not exist.

"I have endeavoured in the following pages to furnish to the sea-side naturalist what the Linnean Genera Insectorum were to me. That such a book is a desideratum I need hardly say. Many a time have I been asked to indicate some published work, whereby the student who picks up a shell from the beach, or a worm from under stones at low water, may know what it is that he has found. I might indeed point to the admirable works of Yarrell, of Forbes, of Johnston, of Baird, of Bell, of Busk, and others who have written Monographs of particular classes or groups. But this is not what is wanted;—the information required is scattered through so large a number of volumes, that a book-case needs to form a part of the sea-side visitor's luggage. Moreover, to persons of limited income the expense of these works often forms an insuperable bar to their possession. Thirty pounds would not purchase the books neccessary for the identification of the marine animals of Britain; while if this sum were expended, there would still remain gaps of awful width,—whole classes, for the recognition of which *no English book is extant.*

I need only mention the Foraminifera, the Covered-eyed, and Ciliograde Medusæ, the Turbellaria, the Sessile-eyed Crustacea, the Annelida, and a portion of the Polyzoa, in proof of this alleged deficiency.

"Let it not be supposed that I think lightly of the Monographs I have alluded to. I should only convict myself of gross ignorance if I were to do so. They are of the highest value,—models of scientific research, acumen and accuracy; but the very care and labour which have been bestowed upon them, to give them the perfection they confessedly possess, have necessarily put them (as a whole body of science) out of the reach of the great multitude of students. My little book is not a rival, but an introduction, to these elaborate works. It is a Manual that can be carried in the pocket, and referred to as the tyro sits upon a weed-fringed rock, or stands on the tide-washed beach.

"I do not speak theoretically only, but experimentally, when I say that such a work as this is a felt need. Most of the books I have alluded to above are in my own library, but still I have often felt the want of a Manual which should contain the characters of every class, order, tribe, family and genus, of our native marine animals, so arranged as to be suitable for ready reference. The Manual did not exist, and I set myself to make it.

"I believe the student will find here the means of learning, with as little trouble and doubt as possible, the generic name of *every animal* that has been recognised by naturalists as inhabiting the British seas; from the lowest sponge up to the whale. To this universality there are only these exceptions:—

"1. That the intestinal worms (*Entozoa*) are not included. Properly speaking, they are no more marine than they are terrestrial animals; for though some of them live in marine animals their proper sphere is not the water or the land, but the living tissues of other creatures; they have a world of their own.

"2. That the swarming millions of animalcules, known as Infusoria, which the microscope reveals in the sea, as well as in fresh water, I have not included in detail, for reasons which will be found under the head of this class.

"Knowing by experience the difficulties which lie in the way of identifying animals by published characters, I have laboured to remove or to lessen those difficulties as far as was possible. I have endeavoured to make these pages practically useful to the beginner, while yet they should be precise enough to serve the advanced

zoologist as a convenient medium of reference. Many of the difficulties in the path of science are not inseparable from it; the language used is often unnecessarily technical, and yet, strange to say, loose withal. Thus we sometimes find one species described as having 'the fore limbs short,' and the next, which is to be distinguished from it, not as having 'the fore limbs long,' but 'the anterior extremities elongated.' Sometimes in the long descriptions which must be waded through and carried in mind, the head in one case is mentioned first, then the tail, then the trunk, the limbs, and so on: but in the succeeding example, which has to be compared with it, perhaps the limbs come first, then the head, then the trunk, &c. Such difficulties as these are most perplexing; and yet it is easy to see that a little care might entirely remove them. If a certain order were maintained in the details of description of kindred forms, and a fixed phraseology, I need not point out how much the work of comparison would be lightened.

"In the wording of the following definitions I have endeavoured to make the phraseology as Saxon as possible. I am far from desiring to rob our language of its Latin element; it would be greatly impoverished by such a privation; and multitudes of words of Latin derivations are as familiar as the homeliest Anglo-Saxon. Still our scientific language might be much more Saxonised than it is, without losing that precision which is indispensable.

"On the other hand, the student must bear in mind that so many of the *ideas themselves* in modern science are new, and custom has so generally affixed to these new ideas classical expressions, that it would be both absurd and often unintelligible to substitute homelier expressions for them — to exchange, for example, such words as *thorax*, *abdomen*, *oval*, for *chest*, *belly*, *egg-shaped;* that others, as *homogeneous*, *parasitic*, *truncate*, &c., can be otherwise expressed only by using many words; and that not a few, as *cilia*, *tentacle*, *antennæ*, have really no correspondent words in Saxon English.

"I have, however, added a glossary for the explanation of such technical terms as were unavoidable; or else have taken care to expound them on their first occurrence. With these aids I trust there is not an expression in the book which a person of average English education will not understand.

"But what I consider the principal feature of this work is the copiousness and character of its illustration. Perhaps I may say that I have enjoyed more than ordinary facilities for a labour of this kind. Having been accustomed from childhood to draw animals from the

life, I have accumulated in my portfolios about *three thousand figures* of animals or parts of animals, all drawn by myself from nature, of which about two thousand five hundred are of the Invertebrate Classes, and about half of these done under the microscope. The portion of the work now issued (Part I.) contains figures of three hundred and forty species,—*a figure of every genus named*,—of which one hundred and twenty are drawn from living, and one hundred and two from preserved, specimens. Those who are familiar with the subject will, I trust, acquit me of vain-glory in affirming that upwards of a hundred figures taken from *living* animals in these low forms, constitute a somewhat unusual feature in a book of this size and price. Of the *character* of the figures I must leave others to judge.

"The entire work will consist of two parts, each complete in itself. Part I., now issued, includes the following classes:—

I. Poriphora.
II. Infusoria.
III. Rhizopoda.
IV. Zoophyta.
V. Acalepha.
VI. Echinodermata.
VII. Turbellaria.
VIII. Annelida.
IX. Rotifera.
X. Crustacea.
XI. Cirripedia.
XII. Arachnida.
XIII. Insecta.

"Part II. is in a state of forwardness, and will be published as soon as possible. It will include the following classes:—

XIV. Polyzoa.
XV. Tunicata.
XVI. Brachiopoda.
XVII. Conchifera.
XVIII. Gasteropoda."
XIX. Pteropoda.
XX. Cephalopoda.
XXI. Pisces.
XXII. Mammalia.

The Glossary requires revision.

'*Annals and Magazine of Natural History*.' No. 94, dated October, 1855; *price* 2*s*. 6*d*. London: Taylor and Francis, Red Lion Court, Fleet Street.

The contents of the October number are as follows:—

'The Vegetable Individual in its relation to Species,' By. Dr. Alexander Braun. [Extracted originally from the Transactions of the Royal Prussian Academy of Sciences for 1853, but the English translation reprinted from 'Silliman's American Journal' for May, 1855.]

'Note on the Subgenus Limea, *Bronn*.' By John Lycett, Esq.

'Notes on the Brachiopoda observed in a Dredging Tour with Mr. M'Andrew on the Coast of Norway, in the Summer of the Present Year.' By Lucas Barrett, F.G.S.

'On the Young States of Some Annelides.' By R. Leuckart. [Extracted from Weigmann's Archiv, 1855, p. 63.]

'Observations on the Genus Assiminia.' By William Clark, Esq.

'On the Morphology of the Organs called Lenticels.' By M. E. Germain de Saint Pierre. [Extracted from the 'Comptes Rendus,' August 20, 1855, p. 305.]

Bibliographical Notice:—'A Manual of Marine Zoology for the British Isles;' by Philip Henry Gosse, A.L.S.

Proceedings of Societies:—Zoological, Linnean.

Miscellaneous:—Sibbald's Drawings of Scottish Animals; by the late Dr. George Johnston. Clausilia Rolphii; by Mr. S. P. Woodward. Note on Helix aspersa; by Mr. S. P. Woodward. Descriptions of some New Species of Birds; by the Viscount du Bus de Gisignies [extracted from the 'Bulletin de l'Academie Royale de Belgique,' vol. xxii. p. 150, 1855]. On the Operculum of Diplommatina; by Captain Thomas Hutton. Note on Aphyllanthes monspeliensis, and the New Family Aphyllanthaceæ; by M. Parlatore [extracted from the 'Comptes Rendus' for the 27th August, 1855, p. 344].

The specimen of Helix aspersa, or common garden snail, noticed by Mr. S. P. Woodward, is an adult shell with a second half-grown individual fixed to its spire and partly imbedded in the suture of the body whorl. The winter-door or epiphragm remains in the exposed part of the small shell's aperture, showing that it had died during the first hybernation, whilst its neighbour had survived, and, not getting free from the incubus of the empty house of the deceased, had partially enveloped it in the course of its growth to maturity.

Entomological Botany (*with more especial reference to the Plants frequented by the Tineina*). By H. T. Stainton, Esq.

(Continued from page 4842).

Prunus Cerasus. Cherry.

Speyer enumerates a great many of the plum-feeders as feeding also on cherry, but it is hardly worth our while to repeat this list; the

special cherry-feeders that he mentions are Vanessa Polychloros (which we are inclined to doubt), Asteroscopus Cassinia, Diphthera ludifica (not yet known as British), Phæsyle psittacata, Tortrix sorbiana and Coleophora hemerobiella. The larva of Argyresthia ephippiella feeds in the leaf-buds in May, and the long mines of the larvæ of Lyonetia Clerckella are not unfrequently observed.

Prunus spinosa. Blackthorn; Sloe.

The list of Lepidopterous larvæ feeding upon this plant is not a short one: Speyer enumerates *Papilio Podalirius*, Aporia Cratægi, *Thecla Spini*, T. Pruni and T. Betulæ, *Procris Pruni* and *P. infausta*, Episema cæruleocephala, Cilix spinula, Drepana unguicula, Saturnia Carpini, Porthesia auriflua, Orgyia gonostigma and O. antiqua, Gastropacha quercifolia and *G. Pruni*, Lasiocampa Quercus and L. Rubi, Trichiura Cratægi, *Eriogaster everia* and E. lanestris, Clisiocampa neustria, Eyprepia grammica (surely some mistake, as this is a grass-feeder, and should be looked for in the open parts of woods in sandy places—in such localities I saw it quite common at Glogau, at the end of May), Hypercompa dominula, Acronycta strigosa, A. tridens and A. Psi, *Diphthera ludifica*, *Miselia culta* and M. Oxyacanthæ, Mamestra Pisi, Orthosia munda, *Catocala paranympha* and *C. hymenæa*, Ennomos lunaria, E. illunaria and E. illustraria, Angerona prunaria, Rumia cratægata, Ourapteryx sambucaria, Geometra vernaria and *G. bupleuraria*, *Aspilates purpuraria*, Crocallis elinguaria, Boarmia consortaria and B. rhomboidaria, Amphidasis pilosaria, *Nyssia pomonaria*, Biston hirtaria, Hibernia defoliaria, H. leucophæaria, H. rupicapraria, Anisopteryx æscularia, Harpalyce corylata, Steganolophia prunata, Abraxas grossulariata, Scopula prunalis, *Nola palliolalis* and Penthina pruniana. In the above list the species not yet detected in this country, many of which we certainly *ought* to find, are indicated by italics. An important addition to the above list, at least it will appear important to all our British Lepidopterists, is Valeria oleagina, of which Guenée says the larva feeds "in May and June on *Prunus spinosa*, principally in shady places or on the borders of woods." Myelois suavella and M. epelydella feed on sloe, and form long tubular galleries on the stems, the outside of which is concealed by a coating of "frass." Of the larvæ of the Tineina feeding on sloe a goodly number may be enumerated, and there can be little doubt that we are far from having exhausted the riches of this plant. Swammerdamia pyrella is frequently to be seen at home here, and Hyponomeuta padella is very abundant in the month of June: the larva of

Cerostoma horridella feeds on the sloe at the beginning of that month. In August and September the leaves will sometimes be observed with the two sides slightly drooping, this effect being produced by the larva of Enicostoma lobella, which feeds on the under side, in a silken tube which draws down the sides of the leaf: the larva of Ypsolophus fasciellus, on the contrary, doubles the leaves *upwards*, forming a complete chamber; it may be found in September. Dasycera sulphurella, which feeds on decaying sloe stems, as well as on almost any other kind of wood, is the next that claims our attention; it may especially be noticed where the black-thorn hedge has been clipped, profiting by all the clefts left in the branches where they have been cut, and betraying its retreat by a heap of ill-digested wooden "frass." Of the genus Argyresthia, the whitish-green larva of A. mendica, the orange-banded green larva of A. albistria (not unlike a miniature P. Machaon) feed on the young leaf-buds in May. Of the genus Ornix we have already bred two species, O. anglicella and O. torquillella, from sloe: the young larvæ mining the leaves might easily be mistaken for larvæ of a Lithocolletis young; but, on closer scrutiny, the mine will be observed much smaller than a developed Lithocolletis mine, for the larvæ of this latter genus have a prescience denied to man, and as soon as they escape from the egg (of which I believe they eat the shell, for hitherto I have been unable to find it), they commence making a mine big enough to last them the term of their natural lives; after which, though the larva trebles its size, the dimensions of the mine remain unaltered, except by the shrinking of the leaf. The Ornix larvæ, after quitting their mines, turn down the edge of the leaf, and feed on the inside of the tubular abode thus formed; any one possessed of eyes may find these freely on almost any sloe bush in July and September. The larva of Coleophora paripennella is to be found very commonly on sloe in autumn, its funny knobby case looking as if laid on the leaves, as in winter and spring we find it attached in the same flat position to the stems of the bushes or to palings. The larva of C. anatipennella carries his case erect, not that it holds its *head* any higher on that account, for it is its *tail* which is elevated at an angle of 90°: it is very common in May, and from its queer black look and pistol-shape is often wondered at by the *ignorami*. C. palliatella I never met with in *propriâ personâ*, so that I cannot say much about it; but as it carries a broad scaly flap on each side of its case, it is even a more extraordinary sight than its congener.

Coleophora nigricella feeds on the sloe, but not so commonly as on hawthorn and apple; its straight case is a very inferior piece of

tailoring compared with the cases of the preceding species. Of the genus Lithocolletis but one species, the variable L. spinicolella, feeds on this plant; it mines the under side of the leaves, and makes but a small mine: the brown blotches on the surface of the leaves sometimes inform us that Cemiostoma scitella has not disdained to feed upon the sloe, though it is more frequently observed upon apple and hawthorn. Of the genus Nepticula the two now well-known species, N. plagicolella and N. Prunetorum, are all that we have at present discovered.

Prunus padus. Bird Cherry.

The especial food-plant of Hyponomeuta Padi, but not that I am aware interesting to us in any other way.

Prunus Lauro-cerasus. Laurel.

Though not generally attacked by larvæ, it is sometimes; I once saw a bush nearly stripped of its leaves by the larvæ of Episema cæruleocephala, and Mr. D'Urban informs me that he has bred both this insect and Porthesia chrysorrhæa from larvæ fed exclusively on this plant; the perfect insect must have been as hard to kill as Mithridates.

Spiræa Ulmaria. Meadow Sweet.

How the mere mention of the name of this plant reminds us of hay-fields and long summer's evenings, and rambles by the banks of streams. My Dipterist friends are of course well aware that there is a Dip. larva very abundant in the leaves of this plant in July: a Coleophora larva has been found on this plant, the case of which resembles the case of the elm-feeding C. fuscedinella, but the perfect insect was not bred, and so we only *suspect* that they should be referred to that species. Strange that a plant so plentiful should not be more patronised by Lepidopterous larvæ.

Spiræa Filipendula. Dropwort.

Abundant at Mickleham Downs, and on other similar localities, but not at present known as the food of any Lepidopterous larva.

Geum urbanum. Wood Avens.

A common but inconspicuous plant in hedge-bottoms and moist shady places; the flower so soon falls to pieces that it rarely attracts our attention, but the burr-like seeds are more conspicuous; the leaves

are not unlike those of the bramble, but without thorns. The larva of Nepticula aurella is not uncommon in the leaves of this plant, and may be found in October, November, March, April, and June and July. The larva of Lampronia prælatella also patronises this plant, but as it more especially favours the wild strawberry, it is mentioned more in detail under that plant.

Geum rivale. Water Avens.

Babington says "damp woods," but though I have been in many a "damp wood" I never yet met with this graceful plant, which is of entomological importance, in order to assist us in unravelling the Linnean Pterophorus didactylus, for Linnæus says specially "Habitat in Geo Rivali," and we find in De Geer a full account of the larva of a "plume" feeding on this plant: he says that "he found the larvæ on the Geum rivale in great abundance in May; they generally keep on the flowers of the plant, and appear to like the calyces of the flowers, which they gnaw, and pierce through and through; neither do they spare the petals, which are equally to their taste, but they do not so willingly eat the leaves of the plant." It may be hoped that this notice will induce some entomologist to send me word that he has known this larva for the last ten or twenty years, and supposed everybody else knew it also. I have had abundant evidence, in the progress of this 'Entomological Botany,' of the truth of Mr. Lees' remark, that "the majority of collecting entomologists are *not of a literary turn*," each, like an animalcule, gyrates in his own small circle, knowing nothing of the larger world beyond.

Nepticula aurella and Lampronia prælatella both feed on this plant as well as on the preceding species.

H. T. Stainton.

Mountsfield, Lewisham,
October 5, 1855.

The Hedgehog devouring its own Young.—About the middle of last August a haymaker in this neighbourhood found a hedgehog's nest containing six young ones. He shortly afterwards mentioned the circumstance to a fellow-labourer, who bargained for the nest, with the intention of giving it to me. Happening to pass during the day, he told me of it, and showed me the nest, but, as the parent was absent, we agreed to leave the young ones (which were as yet blind, and could not be many days old) until we could catch her; this he succeeded in doing the following evening, when he took the whole home. For want of a more suitable cage, he placed them, nest and all, with some food, in an empty tub for the night, intending to send them to me next day. On visiting them in the morning, he was surprised to find five of the young ones eaten,

and all of the sixth except the skin of the back, which was rolled up under the mother, where it remained until I removed it. The mother had undoubtedly made a meal of her young, since nothing could have entered the tub without displacing the covering, which was not moved. I have lately heard of another hedgehog killing her five young ones, under similar circumstances. This is of common occurrence amongst rabbits, but I have not heard previously of its being the case with regard to the hedgehog.—*J. F. Brockholes; 7, Egerton Terrace, Birkenhead, September* 29, 1855.

Note on the Cuckoo.—One morning, towards the end of last May, a country boy, who for two or three seasons has procured me some small birds' eggs, found the nest of a yellow bunting, containing one egg, which he left, expecting the bird to lay more. On passing the place during the day, he observed a cuckoo near, and on looking into the nest he missed the yellow bunting's egg, and found in its place that of a cuckoo. Country boys in this district generally pull a bird's nest out on robbing it, so that the cuckoo, in this case, must have taken the missing egg. There is a popular saying in Lancashire, that cuckoos suck birds' eggs in order to make their voices clear, and the above will tend to show that this is not entirely without foundation. The yellow bunting afterwards laid two eggs in the same nest, and then forsook it. In a few days the boy found another cuckoo's egg in a yellow wagtail's nest, and a third in a sedge warbler's. The statement may be relied on, since I have never detected the boy in trying to deceive me, although I have questioned him minutely.—*J. F. Brockholes; 7, Egerton Terrace, Birkenhead, September* 29, 1855.

Occurrence of the Hoopoe at Low Layton.—A person employed on Tyler's Farm, near Low Layton, being engaged in catching sparrows, had the good fortune to capture a young hoopoe, on the 7th of August last.—*T. Bramley; 9, Winchester Street, Waterloo Town, Bethnal Green.*

A Valuable Hen.—A friend of mine has a hen, which, last spring, laid five or six eggs per week, varying in weight from three to five ounces each: the shell of one which weighed five ounces is now in my collection; it is $3\frac{1}{10}$ inches long and $2\frac{1}{4}$ inches in diameter through the widest part, is roughly finished, and presents the singular appearance of having been in three pieces,—that is to say, the two ends appear to have been cemented to the centre portion before the whole was thoroughly hard. The egg contained only one yolk, which was small in comparison with the size of the shell. The hen combines the American, Dorking and a third breed of poultry.—*J. F. Brockholes; 7, Egerton Terrace, Birkenhead, September* 29, 1855.

Occurrence of Rosecoloured Pastors near the Land's End.—I have just seen four examples of the above beautiful bird, two males and two females; three of them were killed near the Land's End, and the fourth more eastward.—*Edward Hearle Rodd; Penzance, October* 9, 1855.

Occurrence of the Solitary Snipe near Penzance.—The first instance that has come to my knowledge of the solitary snipe having been seen or killed in Cornwall was one handed to me by the gamekeeper of W. B. Praed, Esq., of Trevathon, near this place, who told me he shot it in a small wet morass near St. Ives: its weight was just 7 oz., and from the indistinctness of the bars in its under plumage, with a remarkably short beak, I think it is a bird of the year.—*Id.*

Occurrence of the Spotted Crake and Avocet on the Exe.—On the 17th of September I shot a spotted crake (*Crex porzana*), which rose from a patch of rushes

in our marsh. I believe this bird has occurred a few times before in this neighbourhood. On the 6th inst. a specimen of the avocet (*Recurvirostra Avocetta*) was killed on the mud-banks opposite the town of Topsham, on the Exe, by a man named Hall, who says he saw it feeding before he shot it, and that it worked its bill from side to side under water in a very curious manner: it was almost entirely white, having very little black on it, except the crown of the head and back of the neck. It is a rare bird on this river, and has seldom occurred here before. It has been well preserved by Mr. Truscott, taxidermist, Exeter.—*W. S. M. D'Urban; Newport, near Exeter, October* 11, 1855.

The Great American Snake caught.—The 'Buffalo Daily Republic,' of the 13th of August, announces the capture of the great American water-snake on that day in the Silver Lake, near Perry village, New York. On Sunday, the 12th, the snake came to the surface, displaying 30 feet length of his body. On Monday morning all were on the alert. At nine o'clock the snake appeared between the whaleman's boat and the shore: he lay quiescent on the surface, and the whaleman's boat moved slowly towards him, Mr. Smith, of Covington, pointing his patent harpoon. On reaching within ten feet of the snake, the iron whistled in the air, and went deep into his body. Instantly the whole length of the snake lashed the air, and he darted off towards the upper part of the lake, almost dragging the boat under water by his movement. Line was given him, and in half an hour his strength seemed much exhausted. The whalemen then went ashore, and gradually hauled the line in. When within fifty feet of the shore, the snake showed renewed life, and with one dart nearly carried off the whole line; but he was dragged slowly ashore amid excitement unexampled in the district. Four or five ladies fainted on seeing the snake, who, although ashore, lashed his body into tremendous folds, and then straightened himself out in agony with a noise that made the earth tremble. The harpoon had penetrated a thick muscular part, eight feet from his head. He is 59 feet 8 inches in length, and has a most disgusting look. A slime a quarter of an inch thick covers his body, and if removed is instantly replaced by exudation. The body is variable in size. The head is the size of a full-grown calf. Within eight feet of the head the neck gradually swells to the thickness of a foot in diameter; it then tapers down, and again gradually swells to a diameter of two feet in the centre, giving about six feet girth; it then tapers off towards the tail, and ends in a fin, which can expand in fan-shape three feet across or close in a sheath. Double rows of fins are alternately placed along the belly. The head is most singular. The eyes are large, staring and terrific, with a transparent membrane attached to the lids, protecting the eye without impeding the vision. No gills appear. The mouth is like that of the fish called a sucker; it can stretch so as to swallow a body a foot and a half in diameter: there are no teeth; a bony substance, extending in two parallel lines, covered the upper and lower part of the head. The sides and back are dusky brown; the belly is dirty white. Although sinuous like a snake, there are hard knot-like substances along the back. The harpoon is still in him. He lies in the water, confined with ropes, which keep his body in a curve, so that he cannot get away. He can use his head and tail, with which he stirs the water all aronnd. When he rears his head (which he generally keeps under water) he presents a fearful aspect. In expanding his mouth he exhibits a blood-red cavity, horrible to look at, and the air rushes forth with a heavy short puff.—*Times, October* 1, 1855.

The Loach or Beardie (Cobitis barbatula) *in Confinement.*—This little fish appears to be entirely destitute of the power of swimming as practised by the majority of fishes: it remains motionless at the bottom of the vessel during the greater part of the day, but towards evening, and also in showery weather, it frequently comes to the surface by a violent wriggling movement of its eel-like body; having reached the surface it is totally unable to remain there, either by a continuance of the exertion or by that easy floating which many fishes practise so gracefully: the moment the exertion ceases the fish falls heavily and languidly to the bottom, dropping from rock to rock, or from plant to plant, until it finds a resting-place, where, whether it is a stone or plant, it will remain perched, as it were, for hours: I have seen them rest apparently balanced crosswise on the edge of a vertically-placed stone: aquatic progress seems the result of powerful exertion of the vertebræ. It is excessively voracious, and will consume an incredible number of small worms, that is of worms 1½ inch to 2 inches long; as soon as it seizes one it immediately stirs up the sediment at the bottom of the vessel, making the water so cloudy that the fish instantly becomes invisible. The operculum of the nostril stands up like a minute horn on each side of the face. I have never noticed any indication of familiarity in this fish: it is unconquerably shy, and although its voracity will not allow it to deny itself the gratification of devouring a worm in my presence, yet this is always accomplished *in nubibus*, as above noticed. I keep them in shallow milk-pans or glass globes with a few weeds, and never change the water, unless to cleanse the glass of Confervæ: I have found it die in a zinc tank. In a state of nature it lurks in long floating grass quite as commonly as under stones.—*Edward Newman.*

The Gudgeon (Gobio fluviatilis) *in Confinement.*—This fish, like the beardie, appears to be greatly addicted to reposing motionless on its belly: in this position it will remain for hours; but if the forehead be brought against the glass it darts round and round the vessel with inconceivable velocity: it has no disposition to float in swimming, but its movements, when rising to the surface, are not so laboured as those of the beardie, neither is its descent so languid and helpless. I have had one in a zinc tank with unchanged water for eight months, during which time it has greatly increased in bulk, consuming quantities of worms. The most interesting act I have observed in this fish is that of gliding on its belly, like a slug, up and down the perpendicular sides of a leaden cistern, without the slightest perceptible motion of fins or vertebral column. This fish thrives in a cistern into which water is daily admitted, and from which it is as constantly withdrawn, maintaining itself in good condition without other food than that contained in the water, which is much improved in purity and brilliancy by its presence.—*Id.*

Food of Fishes.—The preceding observation on the gudgeons thriving on the impurities of London water leads me to Dr. Knox's observations on the minute food of the vendace, &c. I am not only willing thoroughly to adopt the opinions expressed by Dr. Knox in his paper in the June number (Zool. 4709), but I had always supposed it a received fact that the principal food of very many fishes was the minute animal life contained in water, and invisible to our unassisted eyes.—*Id.*

Transparent Fishes.—At the recent meeting of the British Association for the Advancement of Science, Professor Kolliker, of Wurzberg, exhibited a series of transparent fishes from the coasts of Messina. The only known fish that can be at all compared with these, in the character of transparency, is the lancelet, *Amphioxus lanceolatus* of Yarrell, who gives an excellent figure and description at p. 618 of the

second volume of the 'British Fishes,' a creature so jelly-like that the great naturalist Pallas actually considered it a slug; but the lancelet is regarded as a cartilaginous fish, while these novelties are osseous, and belong to the genera Leptocephalus, Helmicthys, Hioprorus and Telurus.—*Id.*

The supposed Male of the Argonaut.—In 1842 Professor Kolliker found, respectively on Tremoctopus violaceus and Argonauta Argo, two worm-like creatures closely resembling the Hectocotyle Octopodis described by Cuvier* as found on Octopus granulosus. In 1845 the learned professor communicated to Robert Brown his belief that these were neither more nor less than the males of the Cephalopoda on which he found them. At first sight the professor took them for epizootic worms, to which, from their white colour and numerous suckers, they bore a great resemblance; but when he examined them more accurately he found so many peculiarities, as the existence of a heart, arteries and veins, branchiæ, and coloured contractile pigment-cells, that at length he was compelled to abandon this opinion and adopt one widely different, namely, that they were the males of the most highly organized of all mollusks. In favour of this conclusion he urged that Hectocotyle Argonautæ and H. Tremoctopodis bear a close resemblance to Cephalopoda in general, and in particular to the genera on which they live, for they have the same spermatozoa, contractile pigment-cells, similarly-formed and similarly-organized suckers, and the same arrangement of muscular fibres: again, as to sex, 280 Argonauts examined were females, a male has never been found; the Hectocotylæ are males only, and are always found in the neighbourhood of the sexual organs of the Argonauts; finally, according to the observations of Madame Power and Signor Maravigna, the eggs of the Argonaut contain embryo Hectocotylæ: the last fact seems conclusive in favour of the professor's theory. The foregoing facts have been familiar to all English naturalists for the last ten years. At the recent meeting of the British Association Professor Kolliker exhibited specimens of Hectocotyle, curious eight-armed creatures, with one arm enormously developed, and said to retain vitality long after separation from the animal.—*Edward Newman.*

Scorpion taken at Dorchester.—I lately saw a scorpion taken at Dorchester by the Curator of our Museum there; but on inquiry I found it was captured at the bone-mills, and, as foreign bones are often imported for manure, its introduction seems easily accounted for.—*J. C. Dale; Glanville's Wootton, near Sherborne, September* 18, 1855.

A List of a few rather interesting Lepidoptera that have occurred in the neighbourhood of Plymouth:—

Thecla Betulæ. September 12th, flying about oak trees.

Deilephila Galii. September 5th, a full-fed larva of this species was taken in the garden of Admiralty House, Devonport, by the gardener, who states that a few days previously he took two others of the same species, but fearing they would injure the plants he cut them to pieces. Mr. Dell, of Devonport, is the fortunate possessor of this rare larva. It changed to the pupa the following day.

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* 'Annales des Sciences Naturelles,' 1st Series, vol. xviii. p. 149, date 1829.

Pœcilocampa Populi. September 6th, larva feeding upon poplars.

Lasiocampa Trifolii. This species, in the larva state, is very abundant on the coast from the beginning of May till the first days in July; and the imago from August 25th continues for about a month.

Apatela leporina. Within the last fortnight I have taken six larvæ of this species, feeding upon black poplars.

Heliophobus hispida. I had one of these rare moths come forth from a pupa I took on the coast.

Cucullia Chamomillæ. This summer I have taken five larvæ of this rather rare species.

Heliothis peltigera. Last year and this I have been fortunate enough to rear this rare species.

Ennomos illustraria. This is attracted by light better than by perhaps any other method.

The plumes are represented here by Pterophorus cosmodactylus, P. calodactylus, P. acanthodactylus, P. phæodactylus, and several others, as also the pretty Alucita polydactylus.—*J. J. Reading; 5, Union Street, Plymouth, September* 21, 1855.

Occurrence of Colias Edusa and Colias Hyale near Brighton.—From the 12th to the 22nd of September I have taken, near Kemp Town, five specimens of C. Edusa and two of C. Hyale, and one a female variety of Edusa, C. Helice, a very beautiful specimen, and the exact representation of the one figured in Humphrey and Westwood's book, and which in this neighbourhood seems a very rare insect with collectors: there have altogether been about thirty specimens of C. Edusa and four or five of C. Hyale taken by different collectors in the above locality.—*Frederick Sharp; 100, Trafalgar Street, Brighton, September* 24, 1855.

Double-broodedness of Gonepteryx Rhamni.—Mr. Stainton's inquiries respecting G. Rhamni, in the September number of the 'Zoologist' (p. 4813), are in effect already answered by the excellent remarks of my friends Doubleday and Douglas, which appeared at the same time. I believe no one ever doubted that the hybernated specimens laid eggs in the spring; but with regard to his second query, Do not these eggs produce larvæ which feed up in May? I may be allowed to say that, if such were the case, we should of course find them full fed at the end of that month; and how a larva which feeds on buckthorn, and takes nearly two months to arrive at maturity, could attain its full growth in this country by the end of May, I leave such profound botanists as Mr. Stainton to determine; it certainly appears to me, that for a large portion of its life it would have to subsist on the branches or *roots*, especially in such backward springs as the last. My experience fully confirms the statements of Messrs. Doubleday and Douglas, already published: I found the larvæ early in July last in all stages of growth; these of course were the progeny of the hybernated specimens, and it seems to me quite impossible for them to become full fed earlier in this country. I must protest against Mr. Stainton's assertion, that no one in Britain has noticed the transformations of G. Rhamni, merely because he has not done so himself. It is true Stephens says (Illust. Haust. vol. i. p. 9), "This insect is *apparently* double-brooded." Mr. Curtis ('British Entomology,' p. 175) says, "and the eggs which are then deposited (by the hybernated specimens) produce green caterpillars that feed upon the buckthorn, and again appear as butterflies in August." This is a plain and correct history of the insect, and published some years before Mr. Stainton commenced his able career as an entomological author. I fully admit

that it would appear "the height of absurdity" if we were in reality less acquainted with the history of our Papilionidæ than of the Nepticulæ; but surely those entomologists who, like Mr. Stainton, have devoted themselves exclusively to the study of Micro-Lepidoptera, and have done the most to bring about such a state of things, ought to be the last to find fault with our ignorance of the larger groups. Mr. Stainton informs us, on the authority of Professor Zeller, that Papilio Machaon is double-brooded in Germany; such, I admit, may be the case, but am very certain there is only one brood of the species in this country, and am confident all British entomologists who have had opportunities of judging will support my opinion: the same remarks will also apply to Melitæa Selene and M. Euphrosyne. It appears to have been the custom in former days to imagine there were two broods of any of our Lepidoptera, of which examples might be found in the perfect state in May and August; but it is now a well-known fact that many species which pass the winter in the pupa state emerge therefrom throughout the whole of the following summer: two common examples, Notodonta Camelina and Acronycta Psi, may be given; the larvæ of these species may be found in all stages of growth from July to October, and the perfect insects from April to August following; the larvæ, which become full fed in July, produce in the early spring specimens of the imago, whilst those which do not assume the pupa state till late in the year emerge in the following July and August: a succession of specimens is thus produced, as in the case with Papilio Machaon, &c. It seems needless to add to Mr. Doubleday's unanswerable facts on the perfect condition of hybernated specimens. I will just add that Theristes caudella is well known to pass the winter in the perfect state, and occurs in perfect condition in the spring: on the 5th of June last I took a specimen of this species on Coombe Hurst, in the finest possible condition; of course this insect had existed in the perfect state since the preceding August or September: if such a delicate creature as this, possessing as it does the most ample cilia to the wings of any of our Lepidoptera, could survive the last severe winter in such an exposed locality without injury, we surely cannot be surprised at seeing G. Rhamni in good condition in the spring.—*Edwin Shepherd;* 176, *Fleet Street, October* 4, 1855.

Double-broodedness of Gonepteryx Rhamni.—So many letters having lately been published in the 'Zoologist' under this head, I would not trouble you with the following, did I not think it would tend to throw some light on this much-discussed question. Your correspondent, the Rev. Mr. Greene, asks "Has any entomologist ever seen G. Rhamni, either fine or otherwise, on the wing either in June or July?" In answer to which I beg to state that on the 12th of June last I took several specimens (and saw numbers of others) in Bickly Vale, on the river Plym (about five miles from Plymouth), in very fair condition, far better than they could possibly have been, I think, had they passed the winter in a torpid state, and been subject to the changes of our last cheerless spring: the warm, sunny days at the end of February and beginning of March usually bring out those that have hybernated, and had these specimens been on the wing since that period, whenever the weather permitted, I think they would have presented a most forlorn and ragged appearance, instead of a very fair one (the few previous days to the 12th having been rainy and cold, which might have destroyed their first brilliant appearance). In Devonshire the food of the larva, Rhamnus catharcticus, would probably, even in backward seasons, be sufficiently advanced to afford them support by the middle of April, so that no very rapid progress would be necessary to produce the perfect imago by the beginning of June; again,

if these specimens had been on the wing the previous August and September, and again brought out by the warmth of a March sun, I think most entomologists will agree with me that their term of life must have been an unusually long one. I regret, owing to my embarking a few days afterwards with my regiment for Gibraltar, I was unable to visit the locality again to prove beyond doubt that they were to be taken during the remainder of the month. The specimens which I took are now at Gibraltar with the regimental baggage, to which station I am returning almost immediately, or otherwise I should have had great pleasure in forwarding one for your inspection.—*Charles W. Watkins; Clifton, October* 1, 1855.

Double-broodedness of Gonepteryx Rhamni.—I had no wish to say anything more about G. Rhamni, but I seem almost compelled to reply to Mr. C. R. Bree (Zool. 4871), and I may first remark that the question is not one of *inference*, but of *fact*. Mr. Bree will often find himself in the wrong, if he infers because an insect which appears at a certain period of the year is double-brooded, that another species, which appears at the same time, must be so likewise: the most closely-allied species often differ in this respect; take, for example, Harpalyce russaria and H. immanaria; these two species so nearly resemble each other, that it is sometimes rather difficult to separate the numerous varieties of each; yet the former is always double-brooded, while the latter has only one brood in the year. According to Mr. Bree's argument, Anthocaris Cardamines, which appears at the same time of the year as P. Rapæ, P. Napi and P. Brassicæ, ought to be double-brooded, because these three species are so; but, like G. Rhamni, it is most certainly single-brooded. Mr. Bree asks whether insects which hybernate disappear directly they emerge from the pupæ state, *if the weather is warm*. I reply, that some species most certainly do so, without any reference to the state of the weather, while others seem to continue on the wing in the autumn as long as the weather is fine. To Mr. Bree's next question, whether the intercourse between the sexes takes place in the autumn or in the spring—I answer, invariably in the spring, when both sexes hybernate, as is the case with the Lepidoptera. Mr. Bree's last sentences rather astonish me: he says, "Depend upon it that hybernation of the imago is an accidental or casual occurrence. It is opposed to the whole scheme of insect-life." Surely there is some mistake here, as I thought every entomologist was aware that numbers of species invariably pass the winter in the perfect state, and reappear and deposit their eggs in the spring. Having now replied to Mr. Bree's queries, I cannot conclude without saying that Mr. Stainton's statement, that no living British entomologist had been observant enough to have noticed the transformations of G. Rhamni, is a libel upon his fellow-labourers in Science. That some persons who profess to have a thorough knowledge of the transformations of the minute tribes are profoundly ignorant of the economy of the larger Lepidoptera, I can readily believe; but *all* have not begun at the wrong end. With regard to the first species in our catalogues, Papilio Machaon, I may just remark that I believe we have only one brood in a season: the perfect insects begin to appear in May, and keep coming out all the summer from pupæ of the preceding season. Last year I had about a hundred pupæ in the same cage; the first butterflies appeared at the end of May, and the last in the first week of September: I have had numbers of larvæ at different times, but never reared a butterfly from them the same season. Argynnis Selene and A. Euphrosyne abound here, but I never saw an autumnal specimen, and I rather doubt their being regularly double-brooded on the Continent. I am aware that in some seasons a few specimens occur in August and September, but I believe these are merely individuals

which have gone through their changes prematurely, and are all barren. I have found the larvæ of A. Selene in the early spring sunning themselves on the dead leaves. I never saw the larva of A. Euphrosyne.—*Henry Doubleday; Epping, October* 10, 1855.

Double-broodedness of Gonepteryx Rhamni.—It is said that discussion elicits truth, and I hope it will do so in the present instance: I observe that while those gentlemen who advocate the double-broodedness of G. Rhamni have advanced no single fact in support of their opinion, those on the opposite side appeal to facts only. I have been an entomologist for thirty years, and I learned from positive observation in the second year of my collecting that there was but one brood of G. Rhamni in the year. Nothing can be more clear or more familiar to practical collectors. The hybernated insects are abundant in May: the female lays her eggs; the larva feeds in June and July; the perfect insect soon appears on the wing, and continues to fly until October, when it generally secretes itself for the winter. Mr. C. R. Bree infers from what he knows of the history of Speranza conspicuaria that the same history will serve for G. Rhamni. Inference is not fact. The facts, as repeatedly stated about G. Rhamni, are totally different. Mr. Bree draws another inference totally at variance with fact: he infers that hybernation is accidental or casual, and opposed to the whole scheme of insect-life; now, not only in G. Rhamni, but in polychloros, Io, Urticæ and Atalanta, it always takes place, and the only inference to be fairly drawn from the fact is that it always will.—*H. J. Harding;* 1, *York Street, Church Street, Shoreditch, October* 11, 1855.

[I can now positively state, from my own observations, made during 1855, that Gonepteryx Rhamni is only single-brooded. The term, however, should be explained. The first warm days of spring invite the perfect butterflies, which invariably hybernate, from their winter hiding-places: they copulate in May, and lay eggs on the buckthorn a few days after copulation: the caterpillars feed as soon as the leaves are ready for them: they are full-fed early in July, and become pupæ: these again become butterflies early in August: these butterflies never copulate or lay eggs during the remainder of the year; but on the first frost retire to winter quarters, emerging only on hot sunny days, until the following spring. Thus one cycle of animal life occupies an entire year, and this is what I call single-brooded. I hope I may without offence express an opinion at variance with that of Mr. C. R. Bree at p. 4872: Mr. Bree's opinion is couched in these words, "Depend upon it that hybernation of the imago is an accidental or casual occurrence. It is opposed to the whole scheme of insect-life." I have no hesitation in stating that in many species of Lepidoptera I have found hybernation of the imago to be the positive and constant rule. I have gone so far as to keep late pupæ of some of the Vanessæ in a very cold and dark cellar, with a view of retarding the assumption of the butterfly state; nevertheless most of them changed, and might be seen sitting on the walls and ceilings all the winter; and the few which remained unchanged until spring never became butterflies at all. I am doubtful whether the pupæ of these insects can withstand the cold of winter like those of the genus Pieris; but whether this be the case or no, I cannot for a moment doubt that it is for some good end in the economy of Nature that an Allwise Providence has ordered that certain of the insect-tribes should pass the winter as eggs, others as larvæ, others as pupæ, and the rest as perfect insects; the object of this rule may be inscrutable to us, but this is no ground for discrediting the evidence of our senses.—*Edward Newman.*]

Unusual abundance of Vanessa Io.—On the banks of the river Avon, a short distance from its confluence with the Severn, Vanessa Io was literally in hundreds: every head of Fuller's teasel (*Dipsacus Fullonum*) being covered with them; any one desiring to take specimens might have secured hundreds. Common as this beautiful insect is, I never before saw it in such unusual numbers: I had been in the same locality a few days before and did not see a single specimen.—*Charles W. Watkins; Clifton, October* 1, 1855.

Reputed British Butterflies.—I have found a few notes, written a long time ago, on certain butterflies which the late Mr. Haworth thought it would be better to expunge from the British list. When a person is proved guilty of trying to pass off as British what he knows to be foreign he ought to be well exposed, but he ought also to be thoroughly convicted of it. The Hesperia Vitellius of the old 'Entomological Transactions' is in my possession; it came from the collection of Dr. Abbott, who, I suspect, was a relation of Georgian Abbott [the joint author with Sir J. E. Smith of the 'Insects of Georgia']. I doubt whether Haworth rightly understood Abbott that he lately took H. Vitellius in Bedfordshire; it is more probable that he wrote he had "lately added it to his collection:" unfortunately Haworth destroyed Abbott's letter, in which the facts were mentioned. On seeking for this insect in the British Museum I could not find one exactly like it, but found a species like it on the obverse, but having the reverse entirely different, and another exactly *vice versâ*, the obverse different, the reverse similar. Mr. Westwood is quite mistaken about this insect, the species in his work having no affinity thereto. Mr. Westwood is no less mistaken as to the Hesperia Oileus of the 'Entomological Transactions,' as my original specimen from Dr. Abbott is H. Syrichtus, also a Georgian species, and very much lighter in colour than Mr. Westwood's Oileus. I observe the name Oileus is always quoted with a note of interrogation after it. As the original specimen of Thecla Spini came into my hands, I took it to the British Museum, and having compared it, with the assistance of Mr. F. Smith, I find it to correspond with the T. Silenus of the British Museum, which is identical with the T. Melinus of Hübner, and is a native of Brazil. The pin is old, and had a very foreign look about it. I think Haworth told me he received it from Captain Lindegren, or from a London dealer who said he took it near London. Be this as it may, it has no claim whatever to be considered a British specimen. I have seen no less than four species placed in collections as representatives of Haworth's Thecla Spini; one in the cabinet of the late Joseph Sparshall, who told me he received it from Haworth, who broke his pair to give him one: in another account Sparshall said he received it from Dr. Leach, in exchange for the Gastropacha Pini figured by Curtis. Curtis took a drawing of this insect but I do not know the name of the species. I have seen T. Ilicis, received from Mansfield, also placed as representing T. Spini. Lastly, I have a true T. Spini, received from Chapman, of York, mixed with British insects, and unset, but he very fairly told me he could not warrant its being British.—*J. C. Dale; Glanville's Wootton, near Sherborne, September* 18, 1855.

Capture of the Larva of Deilephila Galii and Stauropus Fagi at Devonport.—On the 3rd of September a friend of mine obtained possession of a larva of the rare D. Galii, taken in the gardens of Admiral Sir W. Parker, the present Port Admiral; two others had unfortunately been destroyed by the gardener a day or two previously. The same person also had, on the 8th of the same month, a fine larva of Stauropus Fagi brought him, taken in the park of the Earl of Mount Edgecumbe.—*W. H. Hayward; Devonport, October* 2, 1855.

Arcturus Sparshalii an Australian Insect.—Mr. Sparshall professed to be very careful not to admit foreign insects into his cabinet, and yet (perhaps by mistake) Arcturus Sparshalii, figured by Curtis, was said to have been taken by him at Horning, and the date given. Boisduval suspected this insect to be American, but there are a pair in the British Museum from Australia. Again, I received from him a specimen of Libellula Tillurgus, the L. Sparshalii of Dale, also taken at Horning, although an inhabitant of the other side of the globe. Sparshall said that as Machaon was taken at the Fens as well as in India and China, why should not other foreign insects occur at Horning?—*J. C. Dale; Glanville's Wootton, near Sherborne, September* 18, 1855.

Capture of Leucania musculosa at Brighton.—On the 17th of August I took, at a gas-light in this hospital, a male specimen of Leucania musculosa: it is a very perfect specimen, and has probably been seen at the Entomological Society by most of the London entomologists.—*John N. Winter; Sussex County Hospital, Brighton, September* 27, 1855.

Capture of Phlogophora empyrea at Brighton.—During the present month (October) I have taken, in company with my friend, Mr. Eagles, five specimens of Phlogophora empyrea at sugar: all the specimens are more or less worn.—*Id.*

[This beautiful insect, previously unknown as British, has been identified and named by Mr. Doubleday. Guenée gives the following references:—"Hüb. 63, 646; Tr. 1. 383; Dup. p. 345, plate 94, fig. 4. Dupenchel's is the best figure. Hab. Italy, central and Western France in September: never abundant."—*Edward Newman.*]

Note on the Habits of Epunda Lichenea.—The larvæ of this insect vary considerably, especially in depth of colour: whilst young many of them are of a beautiful pale green, having a soft velvety appearance, and others are slightly mottled with deeper green, which detracts somewhat from their beauty. On casting their skins, when about half-grown, they assume a very different appearance: in many instances the ground-colour becomes pale or dark olivaceous, whilst many still retain the green, and all become freckled with dusky black on the back and sides: along the back are three rows of dusky black markings, which arise near the head, and continue to near the anal extremity; these are triangular in shape, having their apices pointed towards the head, and in dark individuals they are nearly, if not quite, confluent: a line along each side and the pectoral legs are paler than the ground-colour of the back; the ventral and anal legs and the whole of the under side, in pale examples, still remains greenish, whilst in dark ones they are of an olivaceous green: there are a few hairs scattered over the back and sides, and the head, which is glossy, varies in colour from greenish to brown, in accordance with the larva. No material change takes place now until they are full-fed, with the exception that the general colour becomes darker. They feed voraciously on golden moss (*Sedum acre*), and sparingly on ragwort (*Senecio Jacobæa*), and grow rapidly. On arriving at maturity, which they do in April or early in May, they spin a loose and dirty web a little below the surface of the earth, wherein they undergo the pupa state. A few specimens of the imago occur during the last days of August, but the majority do not appear until after the first week in September. Like many other Noctuæ they are hatched principally during the afternoon, whilst the Diurnæ, on the contrary, generally leave the chrysalis early in the morning. This insect comes sparingly to syrup, though never, I believe, whilst quite fresh. Specimens may be taken more freely resting on dead fences after dark, when their evening flight is over.—*J. F. Brockholes; 7, Egerton Terrace, Birkenhead, September* 29, 1855.

Occurrence of Lithocolletis Bremiella in Britain.—At the October meeting of the Entomological Society Mr. Stainton exhibited leaves of Vicia Sepium mined by the larvæ of Lithocolletis Bremiella, an insect entirely new to Britain, since which Mr. Douglas informs me he has bred thirty or more of the same new species from similar larvæ.—*Edward Newman.*

Note on Tinea granella.—This species must be double-brooded, as I observed, on the 13th inst., many specimens settled on the walls of the granaries in Clink Street, Southwark, which, from their fine appearance, could not long have quitted the pupa state. There were also crawling about on the walls numbers of small larvæ, of a yellowish white colour with brown heads, which were most probably referrible to this species. I likewise noticed specimens of Calandra granaria.—*C. Miller;* 17, *Silurian Terrace, Brooke Road, Dalston, October* 15, 1855.

Note on Colymbetes dispar of Bold.—My Coleopterist readers will recollect that in the Appendix to the 'Zoologist' for 1849 (Zool. App. xxiv.) Mr. Bold described a Colymbetes under the name of dispar: the description was particularly minute, and the author appeared to have taken great pains to ascertain whether any previous description existed. I was unable to obtain a sight of this insect until February of the present year, when Mr. Janson very obligingly allowed me to see a pair presented to him by the discoverer, and it appeared to me that they closely resembled a species I have long known under the name of uliginosus, and Mr. Janson, in the 'Entomologist's Annual,' had previously expressed an opinion that it was probably a variety of that species. Within the last month Mr. Bold has most kindly and liberally sent me a series of both sexes, and I have thus been enabled to give the species a careful examination and comparison, the result of which is that I can discover no difference whatever between dispar of Bold and uliginosus of Paykull. On communicating this opinion to Mr. Bold, that indefatigable entomologist called my attention to the great dissimilarity of the sexes, a character which induced him originally to name the species dispar. On again referring to my sexes of uliginosus, I found the similarity complete in this respect also; and I may here observe that the discrepancy which frequently obtains between the sexes of the Hydradephaga does not appear to have been sufficiently noticed: in Dytiscus and Acilius the elytra are sulcated in the female, and this character appears to be represented, in many species of Colymbetes and Hydroporus, by a rougher surface, causing a dull appearance, which contrasts forcibly with the extreme glabrous and shining surface of the elytra in the males. On subsequently communicating with Dr. Power and the Rev. Hamlet Clark, I was delighted to find that those careful entomologists had, independently of myself and of each other, arrived at the same conclusion as to the identity of dispar and uliginosus. Another question, however, seems to arise, and the result will I believe be the retention of Mr. Bold's name. It is a well-known rule that two species in one genus cannot bear the same name: now, at the time the name of Colymbetes uliginosus was applied to the insect under consideration, there already existed a Colymbetes uliginosus, that specific name having been originally applied by Linnæus, as proved both by description and specimen, to the subsequently named fuliginosus of Fabricius, Gyllenhal and Aubé.—*Edward Newman.*

Occurrence of Scolytus destructor in Lancashire.— Mr. Bold's communication respecting this little "destructive" in the October number of the 'Zoologist' (Zool. 4873), reminds me of its occurrence, *on the wing*, at Stretford in this district in August last; a boat was being laden with recently-felled timber close by, out of which,

I infer, the insects came.—*J. Hardy; Radnor Street, Hulme, Manchester, October* 4, 1855.

Capture of Rhizotrogus ochraceus in Wales.—Mr. Weaver, during his late trip to North Wales, has met with this scarce insect in some abundance, flying by daylight. The insect is smaller and shorter than the familiar midsummer chafer known in our collections as Amphimalla solstitialis; the antennæ of the male are also very different, the club formed by the lamellæ is shorter, and the exterior margin, so conspicuously curved or concave in A. solstitialis, is nearly straight in R. ochraceus. This insect, the Rhizotrogus ochraceus of Burmeister's 'Handbook' ('Handbuch der Entomologie,' vol. iv. part ii. p. 415), is composed of two supposed species, which the author considers varieties: Var. *a*, *pronoto maris fœminæque parum villoso, pubescente* = Melolontha ochracea of Knoch (Neue Beitr. i. 90, 5) and Schönherr (Syn. Ins. i. 3, 176, 60); and Var. *b*, *pronoto maris dense villoso fœminæ pubescente* = Melolontha Fallenii of Gyllenhal and Schönherr (Syn. Ins. i. 3, 175, 51, App. 85, 118); Rhizotrogus Fallenii of Dejean's Catalogue; and Amphimalla Fallenii of Mulsant (Lam. d. Fra. 447, 4): it is mentioned by Stephens ('Manual,' p. 168), under the name of Fallenii, as having occurred in Derbyshire. I think Burmeister has done wisely in uniting these supposed species; but our insect being the var. *a*, and decidedly the Melolontha ochracea of Knoch, whose name has the claim of priority, there can be no doubt about the propriety adopting Burmeister's name of Rhizotrogus ochraceus. I should also state that Dr. Schaum, in the Stettin 'Catalogus Coleopterorum Europæ,' includes a third supposed species, the Amphimalla tropica of Mulsant, an insect with which I am totally unacquainted: he unites the three under the name of Rhizotrogus ochraceus.—*Edward Newman.*

Capture of Melolontha Hippocastani in Scotland.—Mr. Hislop, of Blair Lodge, near Falkirk, has had the good fortune to capture this species in some abundance in his own neighbourhood, and has enriched many of the London cabinets with specimens. At first sight it is distinguishable from Melolontha vulgaris by its conspicuously ferruginous pronotum: the anal style of the female is also much shorter than in that species. Mr. Stephens ('Manual,' p. 168) mentions this species as having occurred on the banks of Windermere: it has also been taken in Ireland.—*Id.*

Capture near London of a Coleopterous Insect new to Britain.—Mr. Janson, the talented Curator of the Entomological Society, is the fortunate captor of a Coleopterous insect quite unknown in Britain, if not altogether new to Science; he informs me it is related to Choleva, and possibly belongs to that curious genus of blind beetles called Adelops: Mr. Janson is investigating its history and nomenclature, and in due time will publish all particulars.—*Id.*

Occurrence of Acrida Standishii at Glanville's Wootton.—I was mentioning only two days ago to Mr. Haliday, who was here on a visit, that I had not seen Acrida Standishii for years, and to-day a female has been brought me, so that my old acquaintance has reappeared this season.—*J. C. Dale; Glanville's Wootton, Sherborne, October* 18, 1855.

Occurrence of Delphax longipennis at Glanville's Wootton.—While Mr. Haliday was here I took a specimen of a very good thing, Delphax longipennis: it is a very active insect, and difficult to secure. I think I had another in the net, but lost it.—*Id.*

Proceedings of Societies.

Entomological Society.

October 1, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Mémoires de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,' Tomes xxviii. and xxix.; 'Bulletins de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,' Tome xxi. Part 2, Tome xxii. Part 1; 'Mémoires Couronnés et Mémoires des Savants étrangers, Tome vi. Part 2; 'Notices Extraites de l'Annuaire de l'Observatoire Royale de Bruxelles pour 1855,' par le directeur, M. A. Quetelet; 'Sur la Relation entre les Températures et la Durée de la Végétation des Plantes,' par M. A. Quetelet; 'Annuaire de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, 1855;' 'Bibliographie Académique ou Liste des Ouvrages Publiés par les Membres Correspondants et Associés Residents;' by the Académie Royale des Sciences, &c., de Belgique. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' Année 1853, Parts 3 and 4; Année 1854, Part 1; by the Société Impériale des Naturalistes de Moscou. 'Bibliotheca Historico-Naturalis Physico-Chemica et Mathematica, von Ernst A. Zuchold,' Vienna, Jahrgang, 2 Heft, July bis December, 1854; by the Author. 'Proceedings of the Liverpool Literary and Philosophical Society during the Forty-fourth Session, 1854—55,' No. ix.; by the Society. 'The Journal of the Society of Arts' for September; by the Society. 'The Literary Gazette' for September; by the Editor. 'Hewitson's Exotic Butterflies,' Part 16; by W. W. Saunders, Esq. 'The Zoologist' for September and October; by the Editor. 'The Natural-History Review,' No. 7; by the Editor.

Election of a Member.

James John Reading, Esq., Plymouth, was elected a Member of the Society.

Exhibitions.

Mr. F. Smith exhibited a fine collection of Coleoptera, made during September, at Deal, including the following species:—

Gymnaëtron Beccabungæ	Phytonomus fasciculosus	Choragus Sheppardi
Ceutorhynchus Resedæ	Otiorhynchus rugifrons	Helops pallidus
Acalles misellus	Limobius mixtus	Haltica Modeeri
„ Roboris	Lixus bicolor	Harpalus cordatus
Sibinia primita	Apion vernale	Amara curta
Erirhinus scirrhosus	„ Sedi.	

Also the following Hymenoptera, taken at the same time and place:—

Pompilus rufipes	Pompilus crassicornis	Astata stigma
„ plumbea	Ammophila lutaria.	

Mr. Smith also exhibited a minute Dipterous insect, Elachipteron brevipennis,

caught by him at Deal on the back of an Hemipterous insect, Nabis subaptera, in the act of inserting its ovipositor under the elytra.

The Rev. J. F. Dawson exhibited a fine series of both sexes of Harpalus cordatus, *Dufts.*, a species so rare in England that at the time his 'Geodephaga Britannica' was published (1854), only a single specimen was known. All the specimens he now exhibited were recently captured by himself at Deal.

Mr. Foxcroft sent from Perthshire for exhibition a box of Lepidoptera, of which the best species were Depressaria ciniflonella and Pœdisca ophthalmicana.

Mr. Bond exhibited a fine series of Heliophobus hispidus, recently captured by himself in the Isle of Portland.

Dr. Power exhibited a specimen of Dinodes Maillei, *Dej.*, taken among moss at Gurnard Bay, Isle of Wight by Mr. Arthur Adams. Mr. Dawson said that as this species was a native of the Morea, and was not found in the countries intermediate between these and England, it could hardly be considered indigenous to Britain: he had frequently seen insects not natives of this country floating in the sea off the Isle of Wight, which he suspected had been brought to the vicinity in ships, and it was possible a similar mode of transit might have occurred in this instance. Mr. Edward Sheppard said Mr. Adams had assured him that there was no mistake about this specimen, for he had a perfect recollection of its capture.

Mr. Newman exhibited a specimen of Xylocopa violacea, accompanied by the following memorandum:—"This bee was taken by Mr. Charles Wood at Dulwich Common the second week in June last: it had flown into a greenhouse, and Mr. Wood, who is a professional gardener, was attracted not only by its extraordinary appearance, but by its loud humming when on the wing. A bee, supposed to be of this species, is described and figured in the 'Monographia Apum Angliæ,' vol. ii. p. 310, and pl. xvii. fig. 9, under the name of Apis iricolor, but the specimen, now in the cabinet of our Society, is evidently an American species, and must have been introduced into Mr. Kirby's cabinet by some mistake. Donovan's 'British Insects,' vol. xii. p. 25, and pl. 403, fig. 1, may also be consulted. I believe the present to be the only really British-captured species of this beautiful bee, but it is very abundant in some parts of France, and I have seen many specimens in the garden of the Tuileries: the large importation of shrubs (especially orange trees) from the Continent for the Crystal Palace may perhaps account for its introduction. I should add that Mr. Wood, finding the interest I took in the capture, has most obligingly presented me with the specimen."

Mr. Stainton exhibited leaves of Vicia Sepium containing larvæ and pupæ of Lithocolletis Bremiella, a new British species, from the neighbourhood of Bexley. Only on Wednesday last he received some similar mined leaves from Frankfort, and, thus instructed, he succeeded in finding these examples on Friday; on Sunday two moths came out, and these were also exhibited.

The President exhibited a scorpion in spirit, presented to him by Mr. Henry Page as the largest ever seen in Sierra Leone.

Destruction of Crops by Insects.

Mr. Westwood said that Mr. D. W. Mitchell, the Secretary of the Zoological Society, had forwarded to him some withered turnip-leaves, as a sample of the plants on ten acres of land, all similarly caused to perish by the attacks of insects: these leaves were accompanied by many Syrphi; but these had not done the mischief, for,

as was well known, they fed upon Aphides, which no doubt were the real depredators. Although the tubers would doubtless perish in consequence of the loss of the leaves, yet they were not affected by gangrene, and so there was no analogy with the destruction of the tubers of the potato, attributed by Mr. Smee to the attacks upon the leaves by the Aphis vastator.

Mr. Lubbock mentioned a similar destruction of turnip crop near Farnborough; and the President said he had heard of another instance near Cranford: he was also sorry to add that Athalia Spinarum or "the black nigger" of the turnip was very abundant this year in several districts.

Mr. Westwood also stated that there had been a vast amount of injury caused this year by the larvæ of saw-flies to pear, cherry, gooseberry and other fruit-trees, amounting in some instances to a total destruction: he thought it might be a very useful subject of inquiry, if the prodigious multiplication of these insects was due to any peculiarity of the season, especially as it appeared that, under some such influence, certain flowers had failed, and others had flourished this year better than usual.

Indian Lepidoptera.

Mr. Stainton read the following extract from a letter addressed to him from Calcutta by W. S. Atkinson, Esq.:—

"What mistakes writers at home make about exotic species! In Swainson's 'Zoological Illustrations,' second series, vol. iii. pl. 101, you will find the pupa of Papilio Polydorus suspended from the tail: this he should have known must be a mistake; I have had several, and of course, like the rest of the Papilios, its head is uppermost, supported by the silken girth. There is a strange confusion about P. Nomius, *Boisd.* (P. Niamus, *Swains.*): Swainson has a very good figure of this well-marked species (which I take here): he says, 'It is a native of *Southern* Brazil, and of such rarity that in two years we never met with more than one specimen;' and Boisduval, vol. i. p. 252, says, 'J'ai cru jusque'à ces derniers temps que les individus que je poissède venaient du Bengal, quoique Godart indique cette espèce comme d'Amerique; mais il me parait demontré aujourdhui que j'avais commis une erreur à habitat, puisque M. Swainson dit l'avoir prise lui-même dans le *Nord* du Brésil:' Swainson must surely be mistaken; for it is hardly likely that this insect is an inhabitant of both the old and new continents. Again, Boisduval, on the authority of Westermann, unites P. Pammon and P. Polytes as male and female: this is certainly not the case. P. Pammon is one of the commonest butterflies here, and I have had several females of the species; some of these, but not all, have red lunules below the central white of the posterior wings, in that respect resembling P. Polytes, but they are never without the band of white blotches on the anterior wings. Blyth, the Curator of the Asiatic Society's Museum here, entirely agrees with me in this; but he assures me that he has seen these two and P. Polydorus *in copulâ* with one another, but that he has tried in vain to rear a brood from them."

Mr. Westwood remarked that General Hearsey had brought from India Papilio Pammon and P. Polytes, which he had found united.

Elateridæ feeding on Aphides.

Mr. Douglas read, from the 'Entomologische Zeitung,' the following note by Pastor Kavall, of Courland:—

"I am able to confirm the fact that the Elaters do not confine themselves to vegetable juices, but attack Aphides. As long ago as June 7, 1847, I saw Elater tesselatus eat Aphides upon Viburnum opulus, and I observed it closely with a lens. I also noticed Elater Ephippium and E. elongatus on Prunus padus similarly occupied. At other times I have seen Elateridæ sucking (the juices of) plants."

Coleoptera of Siam.

Mr. Edwin Shepherd read the following extract from a letter addressed to Mr. Adam White by J. C. Bowring, Esq., Corr. M.E.S., at Hong Kong:—

"You may perhaps have heard that I accompanied my father on his mission to Siam; I did so for change of air, which I sadly wanted. I cannot say that I got the rest and quiet I needed, as we were fully occupied during the whole of our stay at Bangkok, and there was scarcely a night that we were not at it until half-past one or two o'clock: as the thermometer nearly every day was up to 92° or 94°, this was somewhat trying to a semi-invalid, and I am sorry to say I do not find any benefit to have accrued from my trip. Having been so busy you may imagine that I had not much time to bestow on our favourite Entomology; I brought away with me, however, some 500 Coleoptera, taken principally in doors, the insects having been attracted by the lamps: this number, considering all things, is very respectable; but, excepting a few longicorns and Rhynchophora, the species are of very minute size, the whole having been brought away in a pill-box; they are now being mounted, and cut a decent figure. I scarcely yet know how many species there are amongst them, but certainly over a hundred, and any duplicates I have shall go to the British Museum. Most of the insects which came in to the lights were small Bembidiidæ, Staphylinidæ and Pselaphidæ: of these last I have some sixty specimens, comprising five or six species. Bangkok, indeed, would seem to be the very metropolis of the Pselaphidæ kingdom, as every morning numbers were found drowned in the cocoa-nut oil in the burners, and I could have got many hundreds of these greasy gentry.

"The country seems to swarm with insects of all kinds, and any collector who could spare a season for Siam would reap a glorious harvest. On our way from Siam to Singapore we had to call at Pulo Aor to cut wood, having run out of fuel, and while our men were at work in their way, I was so also in mine. It was such a fatiguing matter to force a way through the jungle, the sides of the hill (the whole island being a mountain rising precipitously from the sea) being so steep that I was not very successful, and only obtained about forty Coleoptera, of one or two of which I have duplicates, and these you shall have.

"In Hong Kong Coleoptera I cannot be expected to progress very fast; it is a rare thing now for me to fall in with a novelty, but still I do so occasionally: the other day I got my first specimen of the only beetle in poor Champion's collection, which I did not possess when he left China,—an Orthogonius; I don't know whether it has been described. My Chinese Coleoptera now number some 1300 species.

"I fear we shall not get many novelties from Japan, under our new arrangements with that country; the place, I imagine, will be as much closed against us as ever,

and Admiral Stirling's convention, instead of in any way rendering it accessible to us, seems to me to have quite a different bearing. I *had* quite been looking forward to the receipt of a host of curious forms from that extraordinary country, but I have completely given up all such expectations."

Mr. Newman communicated the two following notes :—

Note on Trochilium Chrysidiforme.

"In the report of the August meeting our Secretary has appended to the interesting record of the capture of Trochilium Chrysidiforme an assertion that the species had previously but two British representatives: if he will turn to page 3289 of the 'Zoologist,' he will find a record by Mr. Barron of the capture of a third specimen near Haslar Hospital."

Hats manufactured of the Silken Felt spun by Saturnia Spini.

"It will be recollected by several of our members that I had the pleasure of mentioning, at a former meeting, the fact of the silk of Saturnia Spini being applied to economical purposes at Vienna. I have lately learned from my friend Mr. Pretsch, who was also my original informant, that the silken felt which I then described has been most successfully applied to the manufacture of hats by Herr Flebus, of Vienna, who has taken out an Austrian patent for this object. The hats are extremely durable and perfectly waterproof, being rendered so by the glutinous nature of the silk itself: they are held in great estimation by sportsmen and gentlemen much exposed to the weather, but the cost has hitherto been too great to admit of any extensive sale. Herr Flebus is, however, about to establish a factory in the district of Erzgebirge, situate between Bohemia and Bavaria, induced by the abundance of the food of the caterpillar and the cheapness of human labour."

New Locality for Geodephaga.

Mr. Douglas said it might be worth while to inform Coleopterists that a week since he took Tarus axillaris and Licinus depressus three miles beyond Croydon: these species had not hitherto been found nearer to London than Reigate or Boxhill.—*J. W. D.*

SOCIETY OF BRITISH ENTOMOLOGISTS.

August 7, 1855.—Mr. HARDING, President, in the chair.

Mr. Millar exhibited, among other Micro-Lepidoptera, specimens of Nothris Durdhamella, bred from larvæ found by Mr. Harding feeding on the wild marjorum (*Origanum vulgare*), and identical with a larva swept by Mr. E. Shepherd near Dartford, which a good deal resembled that of Gelechia rufescens. Mr. Harding stated that he had recently met with this species near Darenth.

Mr. Millar also exhibited a specimen of Colias Edusa, a male, taken by a friend near Darenth Wood, on the 22nd of July.

September 4, 1855.—Mr. HARDING, President, in the chair.

Mr. C. J. Briggs was proposed as a subscriber.

The President exhibited a box of insects, taken principally on the coast of Kent; among them were the following:—Melitæa Cinxia, Sphinx Convolvuli, Lithosia pygmæa, L. quadra and L. complana; Acronycta auricoma, taken near Canterbury; Spælotis cataleuca, Eremobia ochroleuca, Heliothis marginata and H. dipsacea, Plusia orichalcea, Botys fuscalis, B. lancealis, Ceramia ligustrana, Timandra emutaria, T. imitaria, with a number of others. He said that he had also taken four larvæ of Deilephila Galii, and that three of them had gone into the pupa state. In all the years he had been an entomologist he had never seen such numbers of white butterflies as there were this year along the coast; their caterpillars had destroyed all the cabbages. Plusia Gamma and Xylophasia polyodon were also in such number as to be a perfect pest; the former, swarming among the flowers in the evening; the latter rendered sugaring quite a dead letter, as they came in swarms, and their pugnacious habits were such that they drove away any other insects that came: it was quite amusing to witness the battles that took place.

Mr. Millar exhibited specimens of Choreutes scintillulana, Swammerdamia lutarea and Peronea hastiana *var.* Bentleyana. Mr. Millar said the statement of Madame Leinig, that the larva of this species feeds upon birch, is certainly deserving of credit, as Mr. W. Machin has bred it from leaves of this tree, collected indiscriminately, and therefore has not any recollection of the larva. On the 2nd inst., he beat two specimens from a birch-tree in Headley lane: it is rather singular that the perfect insect should exhibit such a partiality for the Lombardy poplar; but Asychna modestella is extremely partial to the blossoms of Stellaria, yet there is no proof that this plant is the food of the larva.

Mr. Millar made the following observations on Cerambyx moschatus:—"I was much amused, one day last July, with the proceedings of a specimen of this common beetle: I had put it away in a chip-box, and on looking at it a few days after I found that it had gnawed the sides of the box, and was in consequence covered with small fragments of wood: its first care on being released from captivity was to free itself from these particles; for this purpose it laid its antennæ on the tarsus of the fore leg, then covered it with the tarsus of the second leg, and, elevating its head slowly, drew the antennæ through; thus was proved the use of the pulvilli, which acted as minute brushes, and cleaned the antennæ from the particles adhering to them: this operation concluded, the tarsi were raised to the mouth, and the palpi passed repeatedly over them, for what purpose I cannot say, but most likely to remove the collected fragments entirely from them. No sooner was the foregoing process ended than the long tibiæ were raised to the base of the elytra, and passed repeatedly over them, until every particle was removed. From some accident one of the wings had got attached to the tip of the corresponding elytron; this it discovered in an attempt to fly; and now to show the admirable conformation of so trifling an object as a beetle—without the least hesitation or sign of perplexity the spine at the base of the tibiæ was passed down the suture of the elytra repeatedly, until the obstruction was removed, and the insect able to fly."—*J. T. N.*

Deer feeding on the Fruit of the Horse-Chestnut.—It is said that the Turks grind (or perhaps crush) the fruit of the horse-chestnut, and give it to horses to improve their wind, whence the name *horse*-chestnut. In this country these nuts are generally deemed useless, and I was not aware they were eaten by any animals till I had ocular demonstration of the fact. Many years ago I was waiting in the churchyard within a nobleman's park, when several deer came up to a horse-chestnut tree not many yards distant from me, and not only picked up the nuts from the ground, but also gathered those on the lower twigs. Moreover, one buck certainly, perhaps more (I do not now recollect the precise number) thrust his horns into the tree, and rattled the boughs about till he had shaken down some of the fruit otherwise beyond his reach. Hard as the nuts are, the deer champed them up with little apparent difficulty, and decidedly as if they were a treat.—*Arthur Hussey; Rottingdean, October*, 1855.

Occurrence of the Creamcoloured Courser on Salisbury Plain.—I have just received a very rare bird to stuff for Mr. Walter Langton, who shot it on East Down, Salisbury Plain, on the 2nd of this month (October): it is the creamcoloured courser (*Cursorius isabellinus*). Mr. Langton was following a wild covey of birds which had pitched on the open down, when his pointers stood at this bird; it got up, flew about a hundred yards, and pitched again: he kept it in sight and shot it on the ground. Mr. Yarrell had the bird to examine in the flesh; he was much pleased with it, and will figure the breast-bone in a Supplement to the 'History of British Birds,' which he is now preparing.—*James Gardiner;* 426, *Oxford Street, October* 30, 1855.

Note on the Common Night Heron.—It has been remarked that in very old birds of this species the number of occipital plumes increase. The usual number seldom exceeds three, and I have observed this number in several examples where the state of plumage exhibited perfect maturity. It is, however, very probable that, without depending either upon age or sex, the number of plumes now and then exceed three; I have heard of one specimen, which came under the notice of Mr. Vingoe, having six. Yesterday I examined a specimen, killed a few years since in the Lizard district, at the same time and in the same locality that afforded me a very beautiful male specimen in perfect plumage, which had three well-defined snow-white plumes. The example now under notice is scarcely so bright in plumage as my bird, but quite adult; but the number of plumes that adorn the head is no less than *ten;* one or two of them are rather shorter than the rest, but differing in no other particular.—*Edward Hearle Rodd; Penzance, October* 27, 1855.

Occurrence of a supposed new Wrasse and other Fishes in Swanage Bay.—Whilst dredging the other day in Swanage Bay I took a wrasse, a description of which I enclose, in hopes that some of your readers may be able to tell whether it is a new species or only a variety of Labrus Comber (Yarrell, vol. i. p. 323) or of Labrus Donovani (Yarrell, vol. i. p. 315). It was of a slender form, bright olive-green on the back and head, lighter on the sides, and silvery on the lower part of head and belly; a silver streak runs from the superior edge of the orbit to the tail, beneath and following the lateral line; the fins shaded and tipped with orange. Length 2½ inches.

Fin formula, D. 20 + 10 : P. 14 : V. 1 + 5 : A. 3 + 8 : C. 14. Within the last two days I have also taken specimens of the æquoreal pipe fish (*Syngnathus æquoreus*, Yarr. ii. 442), green-streaked wrasse (*Labrus Donovani*, Yarr. i. 315), Montagu's sucking fish (*Liparis Montagui*, Yarr. ii. 374). Of the last fish Mr. Couch says it never attaches itself to any fixed substance: the specimen I had certainly did, both to the wood of a pail and to the side of a glass bottle.—*Lester Lester; Langton Maltravers, Dorset, October* 3, 1855.

[The small size of the wrasse implies its youth, and it seems not improbable that it may be the young of the comber wrasse (*Labrus Comber*), a fish which agrees with Mr. Lester's in its slender proportion: this species is of excessive rarity, and its occurrence in Swanage Bay is of great interest. — *Edward Newman.*]

The supposed new Flounder.—Enclosed I send you a more lengthened description of the black flounder than that originally communicated. I have this summer obtained three more, and am more convinced of its being distinct: they are from the same locality as the others. The length of the head is to the whole length of the fish as 7 to 31; the greatest width of the body without the fins is to the whole length as 1 to 3¼. Mouth small; one row of small teeth in each jaw. Lateral line very slightly curved over the pectoral fin, and marked with numerous rough stellated tubercles at its commencement, some more of which are continued below the lateral line as far the widest part of the fish. Scales small. Dorsal and abdominal lines armed with a series of denticulated tubercles, one in each space, between the rays. Upper eye rather the largest, and placed rather more backward than the lower. A strong, prominent, tuberculated, bony ridge between the orbits, the tubercles being continued in a curved line to the commencement of the lateral line. *Pectoral and ventral fins longer and more pointed than in the common flounder* (Platessa Flesus); *dorsal fin commencing on a line with the posterior edge of the lower eye*, extends almost to the tail; ventral fin nearly on a line with the margin of the operculum; anal fin preceded by a spine directed forwards, commences considerably further back than in the plaice, and terminates on the same plane as the dorsal. Fleshy portion of tail narrow; its rays more elongated than in P. Flesus; the four central rays longer than the rest. Fin rays in number are—dorsal 57—59; pectoral 10; ventral 6; abdominal 41; caudal 18. *Colour almost black on both sides. Dorsal line recurved so as to form a notch above the eye.* Seven specimens have been examined by me, and in all of them the characters (which are underlined) distinguish this species from the Flesus. I do not lay undue stress on the colour, as *varieties of all colours are met with* amongst the other Pleuronectidæ; but when, associated with it, I find so many points in which it differs from the common flounder, I think myself justified in regarding it as a distinct species.—*Edmund Thomas Higgins; Birkenhead, October* 13, 1855.

[Unwilling as I always am, and always shall be, to damp the ardour of discovery or oppose opinions advanced by my correspondents, yet I feel myself in some respect culpable if I allow opinions to go forth without comment after I have had reason to doubt their soundness. I have taken great interest in the subject discussed by Mr. Higgins; and have submitted the whole of the evidence to Mr. Yarrell: I have also spoken to several fishmongers on two points, the notch above the eye and the black colour of the under side; and I learn, 1st, that it is a favourite trick of the fisher-boys to cut a notch just in the place indicated when they catch a flounder too small to be saleable; and they do this in order to be able to recognize it when caught

a second time: the cut is a simple incision, but both edges recede in healing, and thus the notch is formed; and 2ndly, that variation in colour, as both sides white, both sides black, and one or both sides piebald, is not extraordinary. Mr. Yarrell has a specimen with the natural colour on the wrong side, not a dextral flounder, but looking to the left like a Rhombus. Seeing, then, that the notch is artificially caused, and that the altered point of the commencement of the dorsal is a consequence of the mutilation, and seeing also that the colour is a mere *lusus* or freak of nature, we have only the altered form and greater length of pectorals and ventrals to deal with; and here I confess that there appears a marked difference, but whether sufficient for the establishment of a new species it requires a far more skilful ichthyologist than myself to decide.—*Edward Newman.*]

Double-broodedness of Gonepteryx Rhamni.—I did not think I should have raised such a controversy when I made a few remarks on the question whether G. Rhamni be double-brooded or not. All that I will positively contend for is that there are two periods of the year, viz. the early spring and July, August, &c., when the butterfly is on the wing in a perfectly fine and bright condition. Mr. Greene, I think, must have been singularly unfortunate in his collecting excursions; for he states (Zool. 4872) that "though he has captured dozens, and seen hundreds on the wing at that season [the spring] he has never been fortunate enough to take one worth placing in his cabinet." I should hardly have thought it worth while to say another word on the subject had it not been that Mr. Greene asks, with an air of considerable confidence, as if the question could not be answered in the affirmative, "Has any entomologist ever seen G. Rhamni, fine or otherwise, on the wing either in June or July? It would be presumptuous in me, on my own individual authority, to deny positively that it has been so seen; but I have collected in Yorkshire, Gloucestershire, Buckinghamshire and Suffolk, and I can confidently affirm that, as far as my acquaintance with those counties extends, G. Rhamni has never been on the wing in June or July." Now this statement does appear to me to be passing strange, having myself seen G. Rhamni on the wing repeatedly in each of these months. On referring to my 'Calendar of Nature,' kept for many years, I find the appearance of G. Rhamni recorded on the 5th, 18th, 21st, 22nd, 24th, 29th, 30th and 31st of July; and to several of these entries I had, in my simplicity added "2nd brood," because the spring appearance of the insect had been previously recorded for the same year. The June appearances have not been recorded in my 'Calendar,' for this obvious reason,—I considered them as belonging to the spring flight which had already been noted. I have had no opportunity of tracing the insect from the egg or caterpillar state, like some more favoured entomologists. Rhamnus catharticus does not occur in this immediate neighbourhood, and though R. Frangula does, I have often examined this shrub for the caterpillar of G. Rhamni in vain. The butterfly itself, too, like several others, has become comparatively scarce in this neighbourhood. In conclusion, I would merely throw out a suggestion for the consideration of some more fortunate entomologists, especially Mr. Doubleday, who appears to have traced the insect from the very laying of the eggs. May not some of the later-bred caterpillars turn to chrysalis and remain in that state through the winter, making their appearance in the winged state in the early spring? Should this be so, it would account for the fine condition in which

many of the vernal specimens do certainly appear.—*W. T. Bree; Allesley Rectory, October* 22, 1855.

Memorandum on Gonepteryx Rhamni.—The specimen of G. Rhamni which I took on the 10th of September (see Zool. 4871) I placed in a large box with a wire gauze door: it remained attached to the side of the box for about a month, when it died and fell to the bottom.—*C. R. Bree; Stricklands, Stowmarket, October* 20, 1855.

Captures of Lepidoptera at Brighton.—On September 15th a fine female specimen of Ennomos alniaria was attracted by the light to this Hospital, and is now in my collection. I have likewise taken during the past year—Acronycta Auricoma; one Diphthera Orion; five Phlogophora empyrea at sugar, *three of them worn;* one Leucania musculosa (of this I have sent previous notices to the 'Zoologist'); Agrotis saucia; one Agrotis obelisca; several Dianthæcia conspersa; several Hadena lutulenta; one pale *var.* of Aporophila australis; three Ennomos illustraria, one bred. Among the Tineidæ I took about fifty of Nemotois scabiosellus in July and August.—*John N. Winter; Sussex County Hospital, Brighton, October* 20, 1855.

Occurrence of Mononychus Pseudacori in the Seeds of Iris fœtidissima—I have just met with a few specimens of Mononychus Pseudacori in the seeds of the Iris fœtidissima (not Iris pseudacorus as given in Stephens), and one of them presents the peculiarity of having the club of the left-hand antenna testaceous, like the other joints, while that of the right is black as usual. I do not remember meeting with a similar instance in that or any other species.—*George Guyon; Ventnor, Isle of Wight, October* 25, 1855.

Curious effect of a Magnet on Flies.—Just after I last wrote to you I observed in the 'Illustrated London News' the remark of a correspondent that a magnet, armed with a piece of iron in the usual way, which was suspended in his study, was carefully avoided by the flies, though they often settled on pieces of iron in the neighbourhood, and if their flight happened to take them near it they immediately turned away. It is well known that wherever a current of magnetism is established a current of electricity exists at right angles to it; this electricity, in the case of powerful magnets, may be developed in the form of sparks or shocks, and it seems to me not impossible that the delicate organization of an insect may be sensitive to the electricity circulating round a small magnet which to our grosser natures is imperceptible. I placed the needle of of a compass, the only magnet at hand, on the table, and a fly presently paraded along it with the most contemptuous indifference—the circuit, however, had not been completed. This discovery, if proved, might perhaps be turned to account, and it would be a boon in tropical climates if the musquito-curtains could be superseded by magnetized bed-posts.—*Id.*

Notes on the Dytiscidæ. By John Curtis, Esq., F.L.S.

I am glad to find that Mr. Clark has commenced his labours preparatory to a monograph, I trust, upon the water-beetles of these islands—a tribe which it is impossible to study, with any degree of satisfaction, from the works of Marsham and Stephens.

There can be no doubt that when this fine family becomes a more universal favourite with entomologists, that many species, rare or even unique in our cabinets, will be procured in abundance, and new species will be detected; but I think we can never expect to find, as was intimated in the last number of the 'Zoologist,' a very considerable number which are natives of France and Germany. It is geographically improbable: nearly the whole of France is to the South of England: the country (viz. two or three degrees) beyond a line drawn from Bordeaux eastward, either skirting the Pyrenees or bounding the Mediterranean, where African types are far from uncommon. France also stretches to the Rhine and Rhone on the East, and as far West as any part of England. France may therefore be presumed to produce most, if not all, of the species found in this country, as well as a very large amount of Austrian and Italian Coleoptera, which we may look for in vain in our island. Our advantage, if any, over the fertile and varied soil and climate of France must be sought for in the North, where, from recent researches, it appears that the Fauna of Scotland is identical with that of Sweden, and in Ireland, which extends much farther West than any part of France or even of Europe.

In viewing this subject impartially and correctly, it will be seen, by referring to other orders and families, that Great Britain cannot compete with France in her entomological productions; for instance, our Heteromera will scarcely fill a drawer, whilst those of France of themselves form an extensive collection; and our poverty is still more manifest in the Buprestidæ, Lamellicorns and Longicorns. Again, if we turn to the Lepidoptera, we shall find France far richer than England. The amount of Papilionidæ must be treble that of ours, whilst Artaxerxes and dispar are the only species we can boast of that are not natives of France. In 1830 I saw on the wing and captured in central and southern France, in an excursion of two months, fifty-one butterflies I had never seen alive before, and it has struck me as a remarkable fact, that whilst in the South of France one finds almost a tropical Fauna as regards insects, the species of the North of Europe are also very abundant, as at Pau, in the Basses Pyrenees, Toulouse, &c., where the Carabidæ, Curculionidæ, &c., of Great Britain are the most common.*

It is therefore to the Lakes of Scotland and Ireland I expect that

* It was only last year that my friend M. C. Delarouzée took Pytho depressus near Cauteret.

we must look for new water-beetles. Dr. Power, Mr. Babington, and others have well searched the Fens of Cambridgeshire; portions of Yorkshire were diligently investigated by the late Mr. Rudd; and I devoted much of my time in my youth to explore the marshes and broads of Norfolk, especially those of Horning and Wroxham. From my success in the Lake districts of England in 1827, I would strongly recommend a good examination of the Lakes of Cumberland and Westmoreland, not neglecting the brooks and rills around Ambleside.

As regards the mode of collecting water-beetles, Mr. Clark's instructions are so complete that I need not enter upon my own practice, except to say that the *rejectamenta* left by floods in the early spring, and sometimes collected on the surface of still waters and eddies near mill-pools or in the angles of rivers, produce a rich harvest of water-beetles, Carabidæ, Staphylinidæ, &c. In setting specimens for collections I would recommend an example of each species to be placed on its back, as the under sides often exhibit peculiar characters of structure and sculpture which have been neglected in this family, where I believe they will be found more than usually characteristic. As the elytra of these beetles are so smooth that they are easily detached when affixed on their backs, a drop or two of nitric acid may be added to the gum to make it more tenacious, which is the basis of the powerful liquid glue of Paris called "Colle forte."

As Mr. Clark invites criticism and solicits information, I will now proceed to contribute what I think may forward his object.

Such vague indications of localities as "Norfolk, Suffolk, &c.," so frequently occurring in our entomological works being useless to the collector, I will subjoin what I can supply from my catalogues, confining my remarks to the rarer species. It may be useful to state that all such notices relating to the above counties which are inserted in the 'Manual' and 'Illustrations' of Stephens were obtained from Mr. Burrell's 'Catalogue of Insects found in Norfolk,' from myself previous to 1824, and from Mr. Kirby's MSS. Mr. Burrell explored the neighbourhood of Letheringsett, near Holt; Mr. Kirby's collecting was confined principally to Barham, Martlesham Heath and the country on that side of Ipswich; and my own researches extended eventually over the greater portion of the two eastern counties. Much uncertainty must exist as to the localities registered by Mr. Stephens, from the fact that the specimens in his cabinet are, to a great extent, incorrectly named; they often do not agree with the descriptions; a very considerable number in the more extensive genera, which bear the names of Gyllenhal and other continental authors, are merely

varieties of our commonest species; and occasionally different species stand under one name, or the same species is located in even different genera: with such incorrect data, it is scarcely safe to rely upon any of the localities, excepting those which are distinctly stated to have been communicated by the captors.

Having for many years kept a journal which was incorporated annually in catalogues of all the orders, extending to four quarto volumes, specifying the localities and dates of capture of each species, as far as the knowledge of my friends and my own experience enabled me, I can speak with tolerable confidence, except in some instances where the names have been transposed from the late unsettled state of our nomenclature; but with regard to the rarer species, the data have been recorded by me with the greatest care, and may therefore be depended upon.

Accuracy is most essential in every branch of Natural History, for errors once in print become permanent, and are not unfrequently widely spread by writers copying one another, instead of referring to the original source. There are innumerable instances of this nature bearing on my own labours, and as it is now thirty years since the first genus of Dytiscidæ was illustrated in my 'British Entomology,' and many entomologists in the country may not have access to the sixteen volumes, I shall refer to the nine genera of that family, with the figures given, adding such corrections as have been considered necessary by subsequent investigations. I hope also that the localities I shall furnish may render the *chasse* of the collector satisfactory and successful.

According to my arrangement, I commence with

HALIPLUS, *Latr.*

1. H. elevatus, *Panz.* In September, 1810, the Rev. J. Burrell took me to a little clear running brook at Letheringsett to show me the locality of this pretty and at that time rare species; we found in company with it Colymbetes vitreus and C. maculatus. These are all more abundant in May.

2. H. ferrugineus, *Payk.*, *Curt. Brit. Ent.* pl. 730. This is the D. fulvus of Fabricius; "Paykull however gave the name of ferrugineus to this Haliplus before Fabricius and Marsham noticed it," vide *Brit. Ent.* fol. 730.

CNEMIDOTUS, *Ill.*

3. C. cæsus, *Duft.*; D. flavicollis, *Marsh.* I remember taking this curious insect in the vicinity of Norwich, but subsequently I used to

find it in the ditches of Battersea Fields, which were, thirty years back, one of the finest localities for insects of all orders in the neighbourhood of London.

PÆLOBIUS, *Schön.*

4. P. Hermanni, *Fab.* I do not find any localities of this fine species recorded by Mr. Clark. I have generally found it in ponds in Epping Forest and on Hampstead Heath, the beginning of April and again in August; it also occurs on Wandsworth Common, preferring clay-pits into which the leaves of trees fall in the autumn; it used also to be taken in Copenhagen Fields, on the spot which is now transformed into the Cattle Market.

HYPHIDRUS, *Ill.*

5. H. variegatus of Stephens is merely a common variety of H. ovatus, as indicated by Mr. Clark. The H. variegatus of Illiger is a very distinct species, only inhabiting the South of Europe and Northern Africa.

HYGROTUS, *Steph.*

When I gave the characters of this group in 1835, I expressed a doubt of the necessity of separating it generically from Hydroporus, and this opinion prevails on the Continent. As, however, the labrum and labial palpi are very different, at least in H. inæqualis, if these differences extend to the other species, they might very advantageously form a section of the genus Hydroporus.

6. H. bisulcatus, *Curt. Ann. Nat. Hist.* v. 5, p. 276. Of this curious little beetle I have a coloured drawing, and it was described by me in the 'Annals,' in June, 1840. "It was taken on Cambridge Fens by the Rev. J. L. Brown."

7. H. decoratus, *Gyll., Curt. Brit. Ent.* pl. 531. This species stood for a long time unique in the British Museum. In July, 1834, it was found in abundance, and given to me by Mr. G. A. Wright, who met with it "on Askham Bog, near Tadcaster, in shallow puddles on the overflowed part of the Bog, where the grass was very thick: in these places water-insects of every description abounded, and the H. decoratus seemed exclusively confined to them," vide *Brit. Ent.* fol. 531.

HYDROPORUS, *Clairv.*

8. H. Davisii, *Curt. Brit. Ent.* pl. 343. This distinct species was one of the many rare water-beetles first introduced to British Ento-

mologists from the streams and ponds at Hebden Bridge, York shire.

9. H. nigrolineatus, *Schön.* This appears to be the H. 9-lineatus of Rudd, and is well figured by Schönherr: it was unknown as a British species until I took a single specimen in Loch Fad, in the Isle of Bute, the end of July, 1825, and both sexes in the same lake the 9th of August, 1834; subsequently Mr. Dale and myself found it not uncommon in Woolmer Pond, four miles to the east of Selborne, Hants.

10. H. latus, *Curt. Brit. Ent.* fol. 343. Of this distinct species Mr. Dale first took a pair in his pond at Glanville's Wootton: I named it H. latus in the first edition of my 'Guide,' published in 1829, and described it in 'British Entomology.' Mr. Rudd subsequently compared specimens he had taken with the one in my cabinet, and of course adopted my name, and gave it to the author of the 'Manual:' it is consequently my H. latus, not Mr. Rudd's, although it is so given by Stephens and others. Some time after I described it, Sturm gave a very good figure of it, under the name of H. ovatus.

11. H. cambriensis, *Curt. Brit. Ent.* fol. 343. I know not what became of the specimen I described, taken in Wales; it might be a variety of D. palustris, *Linn.*, which is the opinion of Mr. Murray; but I apprehend the specimens ticketed in Stephens' cabinet as H. cambriensis cannot be admitted to identify the unique specimen taken by Mr. Davis.

12. H. planus, *Fab.* The little species thus named by Marsham is quite different to the Fabrician insect, and may prove to be the H. umbrosus of Gyllenhal; but the specimens named H. planus in Stephens' cabinet are undoubtedly H. melanocephalus. On the 28th of April, 1842, I took a single specimen of an Hydroporus, closely allied to, if not the true H. planus: I found it under a stone in a pond used for sheep-washing on the downs near Wilton. This specimen, which I was enabled to compare with examples of the Fabrician species sent to me by the late Dr. Sturm, I conceived was identical with the true species; but Dr. Power having recently examined them, he is disposed to think that the Wilton and Fabrician H. planus are distinct: if such prove to be the case I wish to name my specimen H. Harrisii, in compliment to an esteemed friend who took a great interest in the 'British Entomology' during its progress through the press.

NOTERUS, *Clairv.*

13. N. sparsus, *Marsh.*, *Curt. Brit. Ent.* pl. 236, and the difference between the two species are there carefully considered: in addition to the localities there given I may add another,—a pond at Newtown, Isle of Wight, where I took N. sparsus, on the 1st of July.

COLYMBETES, *Clairv.*

14. C. consobrinus, *Curt. Brit. Ent.* pl. 207. This is said to be the D. Cicur of Fabricius, a native of the Cape of Good Hope: it was introduced into my work, in consequence of Dr. Leach and Mr. Wilkin having purchased of Tuther, a dealer in Natural History, specimens which he assured them were taken near Wanstead House, Essex. The individual described and figured by me is in the cabinet of the Zoological Society, and Mr. Tuther received three guineas for that specimen!

15. C. Grapii, *Gyll.* This finely-sculptured insect I first discovered in ditches at Drayton, near Norwich, and at Horning, in May, 1810: it was at first confounded with C. bipustulatus, *Linn.*, and at that time entomologists were very loth to admit that they were distinct, until the difference of sculpture in the elytra was made manifest by a drawing which I possess,—a singular proof how much better Entomology is understood and the species investigated at the present time than it was forty years back.

HYDATICUS, *Leach.*

16. H. cinereus, *Linn.*, *Curt. Brit. Ent.* pl. 95. The four species inhabiting Britain are very local, and one of them (H. stagnalis) is so rare that I have never been able to obtain a native example of it: whether the neighbourhood of Exeter and Netley will ever again furnish specimens I think very doubtful, and Wiltshire, it must be admitted, is a very ambiguous habitat. The other species are taken at Whittlesea Mere in June and July.

DYTISCUS, *Linn.*

As a proof of the importance of attending to the structure of the under side of the Dytiscidæ, not only in reference to generic characters, but in support of specific distinctions, I would call attention to the form of the furcate lobes of the metasternum in this genus, as exhibited in plate 99 of 'British Entomology,' to show

that this character is one of the best to facilitate a correct separation of the species.

17. D. dimidiatus, *Ill.*, *Curt. Brit. Ent.* pl. 99. This, which is the largest British species, has been taken principally at Whittlesea Mere, with D. angustatus, in ditches, in May, June and July.

18. D. flavoscutellatus, *Lat.?* was, by an error, printed "flavomaculatus" in the 'British Entomology:' it is the D. circumflexus of Illiger, and the D. excrucians of Stephens in the 'Zoological Journal.'

Cybister, *Curtis.*

19. C. Roëselii, *Fab.*, *Curt. Brit. Ent.* pl. 151. The female figured by me was found on the 30th of September, 1826, in a puddle at Walton, Essex, by J. Dane, Esq., and is in the cabinet of Mr. J. H. Griesbach. Another specimen was obtained by Mr. Davis, in August, 1831, which had been thrown out of an oyster-basket in the City Road, and the beautiful female in my own collection was taken out of a pond with other Dytisci on the 12th of September, 1836, at Southchurch, Essex, and presented to me by Mr. C. Parsons, F.L.S.

Acilius, *Leach.*

20. A. caliginosus, *Curt. Brit. Ent.* pl. 63. This has been decided to be the D. fasciatus of Degeer, since I published the genus in 1825; it was discovered the previous year at Whittlesea Mere, by Mr. Chant in July.

The variety of A. sulcatus which I named A. scoticus was captured at Kinnordy, in Forfarshire, and presented to me by Sir Charles Lyell.

It is a curious fact that these water-beetles fly by day, when it is fine: an Acilius alighted on a carriage in which I was riding, near Heron Court, on the 15th of September, in the middle of the day, as we were driving towards Bourne-mouth, and at the same time a Colymbetes flew down.

In conclusion, I hope that other entomologists will assist in advancing our knowledge of this interesting tribe, by contributing such information as they may possess, and especially the localities and dates of capture of the rarer species.

John Curtis.

Belitha Villas, Barnsbury Park,
October 18, 1855.

Note on Melolontha Hippocastani.—A larger number of specimens of M. Hippocastani has this year come into my possession than during any previous one; but my information is too limited to enable me to determine whether the greater abundance has been owing to a season more favourable to their development or to a more productive locality having been examined. My friend Mr. Burgess, who obtained two or three specimens for me last year, kindly engaged to watch for the appearance of the insect this summer in the neighbourhood of Doune Castle, Stirlingshire; and during the last week of May and the first week of June he succeeded in procuring many fine specimens, not a few of which are now in the cabinets of friends in the South. In other years the beetle has appeared in the beginning of May. I have this season, for the first time, a specimen from Ayrshire, where also M. vulgaris is said by Mr. Rennie to occur. My oldest specimens are from Cudzow Forest, amongst whose noble oaks the Urus scoticus still leads a half-savage life: the old gardener who collected them there twenty or thirty years ago, when his activity began to fail called in the aid of a canine assistant, which caught them as they rose from the grass at dusk to career among the trees during the night, thereby increasing the number, without, however, improving the quality of his master's specimens. I am here strongly tempted to remark, that many other species sent me in exchange by correspondents in previous years seem to have been taken by terriers also, contrasting as they do most painfully with *unmutilated* specimens that come through the hands of true entomological taste and tact. I have been much struck by the difference in size of all the Scotch specimens I have seen, compared with a couple of Continental ones in my possession. The latter do not exceed $9\frac{1}{2}$ lines in length and $4\frac{3}{4}$ in breadth, while the former are from 11 to $12\frac{1}{2}$ in length and $5\frac{3}{4}$ to 6 in breadth: most of my females singly outweigh both the Continental specimens. It would be interesting to know whether the sizes indicated above generally prevail in the respective latitudes.—*Robert Hislop; Blair Lodge, Falkirk, October* 30, 1855.

Entomological Society and Museum at Melbourne.—When I last saw you in England you expressed a desire that I would sometimes write to you on the subject of Natural History, and I have much regretted that circumstances have prevented me from doing so as I could have wished: you are, however, I am sure, quite aware of the many difficulties which rise up in the path of every new arrival in a colony, and more particularly in that of Australia. Since I have been a resident here I have been able to devote only a very limited portion of my time to my favourite pursuit, and have thus been prevented from maintaining a correspondence with many friends at home (yourself among the number) upon the subjects which are mutually interesting to us. Things are, however, gradually—I may almost say rapidly—settling down to a condition similar to that of the mother country, and consequent improvements in our social condition are every day witnessed: among these advancements I regard as the most important a rising desire among the colonists to investigate and develope the natural productions of their adopted country; and a very excellent Museum is in course of formation in Melbourne. In this establishment, however, the branch of Natural History in which I am most interested (Entomology) is—and, from various reasons, will be—totally neglected: this is a source of great regret both to myself and to many gentlemen here who are interested in this branch of natural science, and we have privately resolved upon the formation of an Entomological Society and Museum, the principal ends we shall have in view being the formation of as large a collection as

possible of the insects of New Holland, the description of new species, and the transmission of as many duplicates as possible to the various Entomological Societies in England, on the Continent and in America. For the proper carrying out of our objects, we most earnestly invite the assistance and co-operation of our friends at home; and I am deputed to write to as many as possible of the leading members of the Entomological Society, and request their advice and support. You are eminently qualified to be of great service to us, and I have presumed upon my slight acquaintance with you to write to you rather fully upon the matter. If you would inform me where and how it would be possible for us to obtain descriptions of the greatest number of known species, and would forward to me a copy of the Rules and Regulations of the Entomological Society of London, you would render us a most important service. Of course it is most desirable that we should know, *as far as possible*, what species have been described, as it would not be advisable to increase the number of synonyms; and a list of the publications in which Australian insects are figured or described, as far as could be given, would be highly valuable to us. I may mention to you that we have many hard-working practical entomologists here, and that correspondents are ready to assist our endeavours in Sydney, Van Dieman's Land, Adelaide and Swan River. I am myself about to start on a journey to the Clarence River, 700 miles north of Sydney, one of the objects of which will be the formation of an entomological collection. In Melbourne alone we already possess nearly 4000 species, my own collection numbering upwards of 2000; many of them, I believe, are undescribed, and more particularly this may apply to the smaller Coleoptera, which are very numerous in Victoria. I need hardly say to you that the field before us is a most extensive one, and must yield a productive harvest. We shall endeavour to publish a journal of our transactions every six months, or at least once in the year, and shall hold it as one of our most particular rules to transmit as many specimens as possible to any Societies desirous of obtaining them. I am of course aware that a vast number of the insects of this colony have long been known and described at home; but I am perfectly certain that we have not yet reached the threshold of our knowledge with regard to the whole, and I believe that the most efficient way to promote this desirable end is the establishment of a society such as that which, I am happy to say, is in a state of progress. A very old friend of yours, Mr. Christy, the engineer, is most warmly interested in the object, and is now naturalising in the district of the River Murray: he desired me to remember him most kindly to you: he has paid great attention to the Lepidoptera, and has figured a great number of species with their caterpillars. The Lepidoptera known to the Melbourne entomologists, as far as I can ascertain, at present number about 700 or 800 species, and most of these have been obtained within a comparatively very short distance of the city. I may observe that of all the orders of insects the Lepidoptera are the fewest in individuals: of butterflies only twenty-eight species are known to us, and these have mostly been obtained in the open spaces on mountain ranges: I am speaking now of the Melbourne district only, as on the Sydney side diurnal Lepidoptera are more frequent than with us: our most common species is a Cynthia, very closely allied to C. Cardui, and, as far as I can judge, identical with it; I have not, however, been able to compare it with a British specimen. You mentioned to me that you were desirous of obtaining specimens of the Longicorns of New Holland; I have collected a great number for you, but I shall not forward them until after my return from the Clarence, as I hope in my journey to find some new and beautiful species. In the meantime, if you will favour me with

any information you may deem useful to us in the formation of our Society, and mention our intention to any of your friends, you will greatly oblige me.—*Henry Edwards; Merrivale, Merri Merri Creek, near Melbourne, Victoria, July* 14, 1855.

The Vinegar Polype.—I cannot regret having sent so long an extract from Huc's 'Travels' relative to the "Tsou-no-dze," as it has elicited remarks from that accurate naturalist, Jonathan Couch, who, on his grand black cliffs at Polperro, allows few denizens of air or sea to escape his observation: he writes to me that he has an opportunity for examining what he supposes to be analogous to the Chinese polype of the Yellow Sea, and that, kept in water not salt, it for some months has furnished a supply of vinegar: he believes it to be a species of Tremella (or Palmella of Harvey), living in water, and at certain periods multiplying by foliations or off-shoots. When he saw the parent plant it was lying in a reddish turbid fluid, having a strong smell of vinegar. He thus describes some of the off-shoots subsequently sent to him:—"When I proceeded to examine the contents of the bottle presented to me, I perceived in it, near the bottom, a disk, which I had no doubt of being one of the so-called plants; and on closer scrutiny I discovered one or two more. I then poured the whole into a bowl, and found no less than four. The largest was about the size of a large breakfast-cup and the thickness of a penny-piece, perfectly circular (although not made so by the containing vessel), and it was so heavy as to fall to the bottom of the fluid in the bowl. The second disk was also circular, of the size of a half-penny and the thickness of a penny. The third was also of the same circumference, but much thicker and cup-shaped—I do not mean hollow or excavated, but resembling a mass of jelly or metal solidified in a cup. The fourth was about the same circumference as the two last named, but perhaps four inches long, and with circular indentations, which made it appear like a number of disks united together. Still, however, they were not evenly united, but, viewed on one side only, bore some resemblance to a slightly cut screw. The skin of the last specimen hung loosely about it, as did that of the large original specimen when I inspected it. It appeared to me that this pellicle ought to be removed, but as yet I have not ventured to do it." This account seems to withdraw the so-called "polype" from the domain of Zoology, in which Huc had placed its congener, but its power of continuously secreting acid, when immersed in a bowl of water, appears to be a novelty in vegetable organisms, and it is a mystery whence it can procure carbon sufficient to form vinegar, when the supply of available carbonic acid gas must be very small.—*Charles Fox; Trebah, near Falmouth, October* 10, 1855.

NOTICES OF NEW BOOKS.

'*Quarterly Journal of Microscopical Science, including the Transactions of the Microscopical Society of London.*' Edited by Edwin Lankester, M.D., F.R.S., F.L.S., and George Busk, F.R.C.S.E., F.R.S., F.L.S. London: Highley. No. XII., dated July, 1855; *price* 4*s.*

The contents of the July number are as under:—

'Observations on Cosmarium margaritiferum and other Desmidieæ.' By Mrs. Herbert Thomas, of Bristol.

'Address of the President at the Annual Meeting of the Microscopical Society,' February 28, 1855.

'An Account of Mr. Peter's Machine for Microscopic Writing.' By R. J. Farrants, Esq., F.R.C.S.

'On the Illumination of Objects by Polarized Light or on a Dark Field.' By John Furze.

'On the Structure of the Cutaneous Follicles of the Toad, with some Experiments and Observations upon the Nature and alleged Venomous Properties of their Secretion.' By George Rainey, M.R.C.S., Lecturer on Anatomy, &c., St. Thomas's Hospital.

'On the Reproductive Organs of certain Fungi.' By Frederick Currey, Esq., M.A.

'On Ciliary Action as the Cause of the Circulation in the Cells of Plants.' By Ferguson Branson, M.D., Sheffield.

'Observations on the Circulation of the Sap in the Leaf-Cells of Anacharis Alsinastrum.' By F. H. Wenham.

'On the Cellulose (in Animals) Question.' By R. Virchow. [Translated from Archiv f. Pathol. Anatomie, ii. Physiologie, &c., vol. viii., H 1, p. 140.]

'On the Action of a Concentrated Solution of Urea upon the Blood-cells.' By A. Kolliker. [Translated from Zeitsch. f. Wiss. Zool. vol. vii. p. 183.]

'Notice respecting the Occurrence of Lymph-Corpuscles in the commencements of the Lymphatic Vessels.' By A. Kolliker. [Translated from Zeitsch. f. Wiss. Zool. vol. vii. p. 182.]

'On the Influence of Caustic Alkalies upon the Motions of the Spermatic Filaments.' By A. Kolliker. [Translated from Siebold and Kollik. Zeitsch. f. W. Zool. vol. vii. p. 181, March 26, 1855.]

'On the Restoration of the Motions of the Spermatozoids of the Mammalia.' By MM. Moleschott and J. C. Ricchetti. [Translated from the Comptes Rendus, No. 13, March 26, 1855.]

'On the Vitality and Development of the Spermatic Filaments.' By A. Kolliker. [Translated from the Verhand d. Phys. med. Gesellch in Wurzb. Bd. vi. 1855.]

Notes and Correspondence:—Reply to some Remarks of Mr. Wenham on the Difficulty of Discovering the Markings or Structure of a Severe Test when mounted in Canada Balsam; by Professor J. Bailey. Aperture of Object-Glasses in relation to Objects in Canada Balsam; by F. H. Wenham. Microscopical Conversaziones. Cheap Microscopes. On "Species" of Diatomaceæ. On a New Locality for Microscopic Test-Objects; by Professor J. Bailey. Memorandum on Flies' Feet; by John Hepworth. On Finders. Memoranda on the

Employment of Artificial Sea-water in Marine Aquaria; by William Alford Lloyd.

Proceedings of Societies:—Royal, Stoke Newington Natural History and Scientific.

Zoophytology.

Occurrence of Trochilium scoliæformis in Wales.—Mr. Ashworth, already favourably known to entomologists as the discoverer of a new Noctua, Agrotis Ashworthii of Doubleday (Zool. 4749), is the fortunate captor of a large and beautiful Trochilium altogether new to this country. This insect is the Sphinx scoliæformis of Borkhausen, subsequently described as Sesia scoliæformis by Laspeyres, who records its having been taken at Darmstadt in May on the blossoms of Rhamnus Frangula: both these authors, however, appear to have only been acquainted with the female, whereas Mr. Ashworth has taken both sexes: this is probably the species of which Mr. Ashworth previously recorded the capture (Zool. 4814), under the name of Trochilium Sphegiforme. I append a description, which may serve as an *Addendum* to my 'Monographia Ægeriarum Angliæ,' published in the first volume of the 'Entomological Magazine.'

TROCHILIUM SCOLIÆFORMIS.

Antennæ maris *nigræ*, feminæ, *ante apicem, late albicantes: thoracis dorsum nigrum, lineis* 2 *obliquis, longitudinalibus, flavescentibus, signatum: abdomen nigrum, fasciis* 2 *flavis barbâque anali croceâ ornatum.* (Long. corp. ·75 unc. Alarum dilat. 1·3 unc.)

Sphinx scoliæformis, *Borkhausen, Naturg. Europ. Schmet.* ii. 173, tab. figs. 2 & 3 fem.

Sesia scoliæformis, *Laspeyres, Sesiæ Europeæ*, No. VI. p. 13, tab. figs. 1 & 2 fem.

Head black, and together with all other black parts, having an iridescent tint; there is a slender whitish line before the eyes, and an indistinct ring of pale yellow round the neck; palpi black above, yellow on the sides and beneath, except the apical joint, which is altogether black; antennæ *of the male* black and ciliated, *of the female* black and simple, with a long whitish space on the apical portion extending almost to the apex: dorsum of the thorax black with two lateral narrow oblique longitudinal yellow lines; pectus with a large quadrate yellow spot on each side: abdomen black above with two yellow belts, the first basal and narrow, the second median and broad; beneath there is one yellow belt, this is median and occupies an entire segment; the sides of the abdomen are also ornamented with somewhat obscure tufts of yellow scales; and its apex with a tuft, which is bright ferruginous both above and below: wings hyaline, the anterior pair with the veins, a median costal spot, and the broad apical lunate fascia and cilia black, the lower margin of the wing gilt with scattered yellow scales; posterior wings with the veins, a median costal spot, and the long cilia black; beneath, the veins and opaque markings of the wings are so thickly sprinkled with yellow scales as to have a glittering golden appearance: legs black with yellow markings; the femora have a yellowish linear mark in front; the tibiæ are almost clothed with yellow scales, except at the apex; the basal joint of the tarsi is also yellowish.

Both sexes taken by Mr. Ashworth at Bryn Hyfryd, near Llangollen, in North Wales.—*Edward Newman; London, November* 6, 1855.

APPENDIX

TO

THE ZOOLOGIST

FOR 1855.

ART. XXX. — *Descriptions of Two Coleopterous Insects new to the British Fauna.* By T. VERNON WOLLASTON, Esq., M.A., F.L.S.

THE following two insects appearing to be hitherto undescribed, not merely in our own country but on the Continent at large, I subjoin the accompanying brief diagnoses, which may serve to characterize them.

Family—STAPHYLINIDÆ.

Genus—HOMALOTA.

HOMALOTA CAMBRICA.

Angusto-linearis, depressa, fusco-picea, subnitida, pubescens; elytris paullo dilutioribus; pedibus pallido-testaceis; antennis gracillimis, fuscis. (*Long. corp. lin.* $1\frac{1}{3}$.)

Narrow, linear and depressed; of a brownish piceous hue, slightly shining, and pubescent. Head roundish quadrate and very slightly narrower than the prothorax, finely and rather sparingly punctured, flattened on the forehead, and with an almost obsolete longitudinal foveolet, which vanishes posteriorly. Prothorax a little narrower than the elytra, and rather more evidently punctured than the head; subquadrate, and very slightly narrowed behind; obsoletely channeled down the disk. Elytra somewhat more diluted in colouring than the head and prothorax, and a little more pubescent. Abdomen linear, rather shining, sparingly punctured, and diluted at its extreme apex. Antennæ rather longer than the head and prothorax, fuscous, and extremely slender; their terminal joint ovate. Legs likewise slender, pale testaceous.

A very peculiar little Homalota, somewhat allied to the H. gregaria of Erichson, but smaller, narrower, more diluted in colouring, and with its legs and antennæ (especially the latter) extremely slender. It is certainly unrepresented in the Stephensian collection, and I am informed by M. Kraatz, of Berlin, that it is probably distinct from anything described in Erichson's Monograph. It would appear to be a mountain species, the only two specimens which I have seen having been captured by myself in North Wales (I believe at Bettws-y-coed) during July.

Family—Lathridiadæ.

Genus—Corticaria.

Corticaria borealis, *Woll.*

Subovato-cylindrica, rufo-ferruginea, pubescens; capite prothoraceque profunde punctatis, illo lato oculis magnis exstantibus, hoc ad latera rotundato et valde crenulato; elytris profunde striato-punctatis, singulo stria fortiore suturali ultra medium impresso, sutura scutelloque sæpius nigrescentibus. (*Long. corp. lin.* 1—1⅛.)

Somewhat ovate-cylindrical, being convex, but a little expanded behind the middle; reddish ferruginous, slightly shining, and more or less clothed (especially on the elytra) with a pale rigid pubescence. Head and prothorax deeply punctured; the former very wide, and with the eyes large and prominent; the latter convex, rounded at the sides, and with its extreme lateral edges powerfully crenulated. Elytra coarsely striate-punctate, each of them having a more deeply impressed stria alongside the suture, behind the middle; the suture (particularly behind the middle), and occasionally the lateral margins also, together with the scutellum, more or less black. Antennæ and legs a little paler than the rest of the surface.

The above description has been compiled from three specimens of a large, and apparently new, Corticaria, in the possession of G. R. Waterhouse, Esq., of the British Museum, which were captured many years ago by Charles Darwin, Esq., though in what locality I am unable to ascertain, I possess, however, two examples, taken by Mr. Hardy on the coast of Durham, and (if I mistake not) registered as the C. crenulata in his enumeration of the insects of that county and of Northumberland. It seems to be undescribed in Mannerheim's Monograph of the genus, and unnoticed in the 'Catalogus Coleopterorum Europæ,' published at Berlin in 1852. I may add, that on the return of M. Motschoulsky to St. Petersburgh, after his visit to England in 1851, I took the opportunity of sending it for comparison with his large assortment of Mannerheim's types, with none of which it would appear to agree. It is a very singular and well-marked species, its cylindrical outline, wide head and prominent eyes, in conjunction with its usually darkened suture (which has a deeply impressed stria

on either side of it, behind the middle) and scutellum, giving it a character which it is impossible, even *prima facie*, to mistake.

T. V. Wollaston.

Art. XXXI.—*Revision of the Characters of Deretaphrus and Descriptions of Two New Species.* By T. Vernon Wollaston, Esq., M.A., F.L.S., and Edward Newman.

Order—Coleoptera.

Section—Necrophaga.

Family—Colydiadæ.

Genus—Deretaphrus, *Newm.*

Corpus angusto-elongatum, parallelum, subcylindricum: prothorace subcordato, angulis anticis deorsum leviter productis: mesothorace cylindrico, superne subobservando, scutello rotundato: elytris (præsertim circa humeros) longitudinaliter costalis, necnon profunde sculpturatis: abdomine e segmentis ventralibus sex composito. Antennæ prothorace breviores crassæ, articulo 1mo valde robusto subgloboso intus (ut in gen. Bothrideres) inflato, 2do et 3tio vix brevioribus (illo ad basin flexuoso), inde ad 8vum transversis brevibus (longitudine latitudineque vix crescentibus), reliquis poculiformibus, clavam intus leviter triserrato-ampliatam efficientibus), 9no et 10mo latis, ultimo minore angustiore ad apicem valde truncato). Labrum sub fronte fere opertum, submembranaceum, transversum, ad latera necnon ad angulos anticos rotundatum, apice fere integrum sed pilis longissimis introrsum vergentibus densissime ciliatum. Mandibulæ magnæ corneæ robustissimæ crassæ glabræ, ad apicem obtusæ sed fortiter bidentatæ, margine interno subintegro et membranâ haud instructo, basin versus externam profunde sinuatæ. Maxillæ bilobæ, valde pubescentes: lobo externo latiusculo; interno huic angustiore et paullo breviore, ad apicem ipsum minutissime uncinato. Palpi subfiliformes, articulo ultimo subfusiformi elongato. Mentum amplissimum, corneum, transversum (antice versus utrumque latus profunde fissum). Ligula parva angustissima, valde pilosa, ad apicem tenuissime membranacea rotundata ac leviter dilatata. Pedes validi: tibiis compressis et apicem versus dilatatis, ad apicem externum in spinam exstantem productis, ad internum calcariis duobus inæqualibus (nisi fallor mobilibus, necnon ad basin articuli tarsorum primi affixis) armatis (calcari superiore in anticis, inferiore in posterioribus, majore et leviter incurvo):

tarsis 4-articulatis, articulis 1mo, 2do et 3tio paulatim vix decrescentibus, ultimo majore clavato, unguiculis simplicibus munito.

Typus: Deretaphrus fossus, *Newm.* (ex Australiâ).

Regarding the affinities of this genus there cannot, I think, be the slightest question, retaining as it does all the characteristics of the Colydiadæ, even though it presents, at the same time, many anomalies of a minor kind which may serve to connect it in some measure with other departments also far removed. Thus, in its external contour (so strongly suggestive of Colydium proper) and tetramerous feet it is precisely in accordance with the normal members of that family; in the inflation of the basal joint of its antennæ it is the exact counterpart of Bothrideres; and in the construction of its tibiæ it has much in common with the Lycti. From the Trogositidæ, to which at first sight it might be supposed perhaps to be allied, it is altogether separated by its four-jointed tarsi and the full development of its inner maxillary lobe; whilst its general facies and subcylindrical body are more indicative of a lignivorous mode of life than of the bone- and skin-infesting tendency which is so strongly displayed in the representatives of that group. The construction of its thickened and greatly abbreviated antennæ, with the curious foreshortening of their terminal articulation, is very peculiar, calling to mind a good deal what we observe in Thorictus, with which genus, moreover (although in other respects by no means related to it), in the form of its robust and glabrous mandibles, it, singularly enough, almost coincides. Its tibial spurs are moulded on a very remarkable type, being of unequal dimensions, and the larger of the two (which in the anterior pair of legs is the front, and in the posterior four the hinder, one) considerably developed, and subcompressed, somewhat after the manner of those of Melöe and other Heteromera. I think it far from unlikely also that, like them (although I have not been able to satisfy myself of this from positive observation, having been unwilling to destroy the single specimen from which the above generic diagnosis has been compiled), they may be articulated on to the basal joint of the foot, and therefore of a moveable nature, rather than fixed appendages of the tibia itself.

Upon the whole, however, there cannot, I imagine, be much doubt that Deretaphrus is rightly referred to the Colydiadæ; and I should be inclined to suspect that, when placed between Colydium proper and Bothrideres, it will be found nearest to those groups with which it has the most evident affinity.

It may perhaps be useful to mention, that the main points of structure in which Deretaphrus recedes from Colydium are in the excessive robustness of its antennæ and the proportions of their joints, particularly in the inflation of the basal, and in the smallness and truncature of the ultimate, one; in its more concealed upper lip; in its larger, robuster and more obtuse mandibles, which are deeply sinuated towards their outer base, with their apex merely bidentate, and their internal margin almost entire and free from membrane; in the more distinctly uncinated inner lobe of its maxillæ; in its larger, differently shaped

and more corneous mentum; and in its smaller, narrower and more pubescent ligula.

T. V. Wollaston.

The genus Deretaphrus was first characterized by myself at p. 403 of 'The Entomologist' for October, 1842, and four species were described, all of them Australian: no critical observations are appended, but it is placed as an ally of the Ptinidæ.

The second notice of the genus, obligingly pointed out to me by Mr. Janson, is at p. 287 of the 'Naturgischichte der Insecten Deutschlands,' from the pen of that great Coleopterist, Erichson, who (agreeing with Mr. Wollaston) places it in his family Colydii, thus characterized:—"Antennæ rectæ, clavatæ vel capitulatæ. Coxæ anteriores globosæ, posticæ transversales semicylindricæ. Tarsi 4-articulati. Abdomen segmentis ventralibus 5, anterioribus 3 vel 4 immobilibus." Erichson divides the family into seven groups, of which the third is thus distinguished:—"Palpi filiformes. Pedes postici distantes. Abdomen segmento ventrali primo reliquis majore." In this group the genera are three in number, and are thus tabulated:—

Mouth beneath	covered		Deretaphrus.
	free: anterior legs	approximate ...	Sosylus.
		distant ...	Bothrideres.

The third of these genera only is German; the others are therefore only briefly alluded to. Deretaphrus is thus noticed:—"Deretaphrus of Newman is a New Holland form of more attenuated and more cylindrical shape than Bothrideres, and also differs from this genus partly in having the club of the antennæ triarticulate, and partly in having the mouth entirely covered beneath by a flat continuation of the margin of the throat: the pits also in which the anterior legs articulate are divided from each other by a narrow partition only; and the intermediate legs likewise are not widely separated. The thorax has a central longitudinal furrow. Of the four species given by Newman, *loc. cit.*, only the first, D. fossus, *Newm.*, from which the generic character is drawn up, and perhaps also the second, D. puteus, *Newm.*, which the royal collection of this place does not possess, are to be referred to Deretaphrus; the other two appear to belong to Bothrideres: on the other hand, there are in our collection three nondescript species of Deretaphrus."

The third notice of the genus occurs at p. 222 of the 'Linnæa Entomologica,' in a paper intituled "Beiträge sur Insecten fauna von Adelaide, von E. F. Germar," published in 1848. The type species is the same, but unfortunately both genus and species are renamed as new, no mention whatever being made of

the two prior descriptions: the characters, however, are drawn up with Professor Germar's usual skill, and the location of the insect in the family Colydii is confirmed:—"Fam.—Colydii. Genus—Sigerpes, *Germ.* Antennæ mediocres, 11-articulatæ, articulo primo incrassato, sequentibus brevibus, ultimis tribus distincte crassioribus, transversis, ultimo truncato. Palpi breves, filiformes. Oculi parvi, parum prominuli. Caput postice constrictum, collo exserto. Pedes breviusculi, omnes basi distantes; tarsis 4-articulatis, articulis simplicibus. Genus Pycnomeris affine, sed clava antennarum 3-articulata, collo exserto, et thorace elongato, postice valde angustato distinctum."

The fourth and last notice is that with which Mr. Wollaston has so kindly furnished me, and which is printed verbatim above. The characters drawn up from a single specimen of Deretaphrus fossus of course have a tendency to restrict the limits of the genus, and thus to corroborate the previously expressed opinion of Erichson that certain of the species should be eliminated. My own opinion, not to be weighed in the balance against that of Erichson and Wollaston, is rather the extension than the restriction of generic divisions on account of the encumbrance to Science caused by the multiplicity of names; but I cannot conclude this remark without inviting the attention of entomologists to the profound knowledge and genius of Erichson, who, from descriptions of a few words each, could pronounce unhesitatingly an opinion on the affinities of insects, which should be confirmed by the independent testimony of Professor Germar and the careful dissections and elaborate investigations of Mr. Wollaston.

Deretaphrus Wollastoni.

Niger, prothorace confertim puncto, punctis confluentibus, elytris argute carinatis interstitiis profunde ac striatim punctis. (Corp. long. ·47 unc. lat. ·14 unc.)

Black; head coarsely punctured; prothorax deeply and coarsely punctured, the punctures confluent; at its base, and extending nearly to the centre of the disk, is an obscurely defined sulciform median depression, and parallel with this, on each margin, is a ridge or keel of corresponding length, which does not follow the curved margin of the prothorax where it widens, but is continued in a direct line towards the anterior margin, ceasing, like the median depression, about half-way between the anterior and posterior margins of the prothorax: elytra carinated, the keels (nine in number on each elytron) sharply produced and strongly pronounced; the first next the suture is the least elevated; each interstice is impressed with a series of deep punctures: the under surface of the entire insect is deeply and regularly punctured.

This species somewhat resembles Deretaphrus fossus in size, habit and colour; but the sculpture, as described above, is perfectly distinct. It forms part of a rich collection made in the vicinity of Moreton Bay, North Australia, by Mr. James

Gibbon, to whose courtesy I am indebted for the opportunity of examining this and many other most interesting novelties from the same locality. I have named this insect in honour of Mr. Wollaston, whose profound knowledge as a Coleopterist is only equalled by his kindness in imparting it.

DERETAPHRUS ERICHSONI.

Rufo-piceus; capite puncto, punctis minutis sparsis distinctis; prothorace puncto, punctis majoribus crebrioribus, medio longitudinaliter vage impresso; elytris carinatis, carinis postice interruptis in tuberculos salientes divisis, interstitiis profundis serie unica punctorum magnorum impressis. (Corp. long. ·47 unc. lat. ·14 unc.)

Pitchy red, approaching to black towards the apex of the elytra: head impressed with a small epicranial fovea, and there is another more conspicuous immediately adjoining the epicranial margin of each eye: the entire epicranium is minutely punctured: prothorax punctured more coarsely and regularly than the head: elytra carinated, the carinæ interrupted towards the apex, and broken, as it were, into salient, irregular, and sometimes rather acute tubercles: under surface of the insect uniformly punctured, pitchy red, shining; coxæ, together with the space immediately surrounding them, and apex of abdomen, darker: legs pitchy black, with redder femora; exterior margin of tarsi strongly serrated.

Habitat: Adelaide, South Australia. There are two specimens, from the collection of Mr. S. Stevens, in the cabinet of the British Museum. I have named this in honour of the late Professor Erichson, whose memory I revere as that of one of the greatest Coleopterists the world has produced.

The described species of Deretaphrus, exclusive of those which Erichson proposed to remove to the genus Bothrideres, are now four in number: 1. D. fossus, *Newman, Entom.* 403, synonymous with Sigerpes piceus of Germar. 2. D. Wollastoni, *Newman*, described above. 3. D. Erichsoni, *Newman*, described above. 4. D. puteus, *Newman, Entom.* 404. They are all peculiar to Australia, feeding under the bark of trees, principally Eucalyptus.

EDWARD NEWMAN.

ART. XXXII.—*Characters and some Account of the Economy of a supposed New Species of Australian Bombyx.* By EDWARD NEWMAN.

BOMBYX (DORATIFERA?) OXLEYI.

Fœm. *Castaneo-fusca; alarum limbo anticarum lato albido, posticarum ciliis tantum pallidis; abdomen subtus apice densissime lanugine fusco vestitum. (Corp. long. 1·6 unc. alar. dilat. ·6 unc.)*

Female.—Palpi small, short, clothed with pale scales, their apices bent downwards: maxillæ not observed, probably wanting; scales of the face brown, of the epicranium bright ferruginous; at the base of each antenna is a little erect tuft of brown scales; the apices of these tufts are connivent, approaching each other above the epicranium; the antennæ are moderately long, quite simple, and pale brown: scales on thorax, immediately behind the head, long, loose, and bright ferruginous, the rest brown; scales on dorsal segments of abdomen short, closely appressed, reddish brown, on the sides and beneath long, woolly, and dark brown, forming a large and dense apical mass. *Above*, anterior wings reddish brown, the oblique exterior margin with a broad pale band; the discoidal dark brown portion of the wing is somewhat more deeply coloured at the base, along the costa, and at the upper inner margin of the pale band: the wing is marked throughout with slightly undulated oblique parallel lines, which seem rather to result from an undulating character in the membrane of the wing than from diversity of colour: posterior wings uniform concolorous brown, the cilia alone pale. *Beneath* brown; the tips of the anterior wings, an obscure stigma and the cilia paler.

This moth is nearly allied to the Bombyx vulnerans of Lewin's 'Lepidoptera of New South Wales,' pl. 4,—Doratifera vulnerans of Westwood, described at p. 181 of Duncan's 'Exotic Moths,' which forms No. 7 of 'The Naturalist's Library.' The larva of that species is "of very singular aspect, broad, thick and massive, with four reddish protuberances on the anterior part of the body and four behind. These knobs it has the power of opening at pleasure, and darting out eight rays or bunches of stings of a yellow colour: * * * the wound inflicted by these little fascicles of stings is described by Lewin as very painful and venomous, and it darts them forth whenever it is alarmed by the motion of anything approaching." The cocoon of B. Oxleyi is remarkably small for the size of the moth, being scarcely larger than a good-sized pea: it is of an oval shape, extremely compact, and not to be broken without a sharp blow; it is composed of a glutinous substance secreted by the larva, and mingled with highly comminuted particles of the rind of a twig of some species of Eucalyptus, to the denuded wood of which it is firmly attached, the caterpillar evidently laying bare a portion of the twig with its mandibles and employing the fragments in the fabrication of its cocoon, the smaller end of which is provided with an operculum or lid, which separates only on the imago arriving at maturity, and leaves a smooth-margined, perfectly circular aperture, through which the moth escapes. I am indebted to Mr. Oxley for the opportunity of describing both the moth and the cocoon, and have much pleasure in dedicating the species to that zealous entomologist. I do not find any characters of the genus Doratifera.

EDWARD NEWMAN.