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THE
WORLD OF INSECTS:

A GUIDE TO ITS WONDERS.

BY

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SECRETARY TO THE ENTOMOLOGICAL SOCIETY OF LONDON.

"Corde et manu."

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TO

WILLIAM SPENCE, ESQ., F.R.S., F.L.S.,

JOINT AUTHOR OF THE 'INTRODUCTION TO ENTOMOLOGY,'

ETC., ETC.,

AS A SMALL TRIBUTE OF GRATITUDE

FOR HIS LABOURS

IN THE CAUSE OF NATURAL-HISTORY SCIENCE,

AND OF ADMIRATION FOR HIS PRIVATE CHARACTER,

THIS ATTEMPT TO ENLARGE

THE SPHERE OF MENTAL OCCUPATION FOR THE MANY

IS RESPECTFULLY DEDICATED

BY

THE AUTHOR.

“ The world is too much with us ; late and soon
Getting and spending, we lay waste our powers :
Little we see in Nature that is ours ;
We have given our hearts away, a sordid boon !
The sea that bares her bosom to the moon,
The winds that will be howling at all hours,
And are up-gathered now like sleeping flowers ;
For this, for everything, we are out of tune ;
It moves us not.”

WORDSWORTH.

“ Whatever our wanderings, our happiness will always be found within a narrow compass, and amidst the objects more immediately within our reach ; but we are seldom sensible of this truth (hackneyed though it be in the Schools of all Philosophies) till our researches have spread over a wide area.”

BULWER—*The Cartons.*

P R E F A C E .

“BUSINESS must be attended to.” Undoubtedly. There is no need to insist upon the maxim, for it is observed as religiously as if it comprised the whole duty of man. Rather should it be, “The intervals of business must be attended to.” Business is a compulsory affair—a man’s leisure is his own; and for his own sake, as well as that of the community, it should be leisure of occupation. And, as mere mercantile business has a tendency to contract the range of thought, and to give a money value to all matters, a man’s pleasures and recreations should have a contrary character, and cultivate those powers of

his mind that are untouched by his business avocations; in order that he may see all things on both sides and in their true light.

There is no employment for leisure hours, whether they be the few of the man of business or the many of the man of no business, more innocent in itself or more productive of benefits than the pursuit of Natural History generally; and Entomology, or the Natural History of Insects, on account of the number, beauty and accessibility of its objects, has peculiar advantages as a means of popular recreation. Once begun, *ennui* and the want of something to do vanish, every step is on enchanted ground, and on all sides the prospect becomes more and more enticing. The inducement to go out of doors,—the walk with a purpose in view,—so different to that most dreary of all employments, walking for the sake of exercise,—is itself no mean advantage. Then the collector wants to know something about the nature of the insects he has acquired, and begins to study their habits, forms and relationships.

This calls into exercise the practice of patience, of minuteness and accuracy of observation, and eventually of cautiousness in induction and generalization; all of which, besides their value as elements of mental discipline, are qualities serviceable in an eminent degree in the business of life. Bonnet has said, "When I see an insect working at the construction of a nest or a cocoon, I am impressed with respect, because it seems to me that I am at a spectacle where the Supreme Artist is hid behind the curtain." Who can view such scenes continually without forgetfulness of self, and having his thoughts carried upwards, and becoming not only a wiser but a better man!

Contrast with such an employment of leisure the way in which the majority of young men spend their spare hours,—dissipation, frivolous amusements or the ephemeral literature of the day,—and who can be surprised that the result, so far as regards the cultivation of the individuals, is *nil*, the balance being on the other side. There is a minority of young men, I know, that do better

than this, yet, without any desire to undervalue literature or art,—nay, with every inclination to reverence and appreciate genius of every kind, whether showing the power of mind over mind or the power of mind over matter,—I still believe that man and his doings, his follies and his crimes, engage too much of our attention. And if we go beyond the circle of human sympathy, I fear we are too prone to be passive: we like knowledge to come to us second-hand — filtered through other men's brains; and we take their conclusions — the truth as it appeared to them — to be the whole truth. But no man, however great, has so thoroughly comprehended any subject as to have exhausted it; every phase of Nature has yet at least another point from which it may be viewed. For observers and reasoners Natural History still offers a boundless field. I have no wish to elevate Entomology above its rank in the scale of Natural-History Science, nor to laud it as a panacea for the evils accruing to society from the waste of time; but I am sure that, whether as a recreation, a study, or both, it would give to multitudes a

pleasure, of which, although so sadly in want, they have now no idea.

When it is considered that there are above ten thousand species of insects in Britain, it will be obvious how few of the wonders of insect-life I have been able to indicate within the limited compass of these pages. For the same reason it will easily be understood that no single individual can ever hope to have within his own experience the natural history of even the insects of his own country; and when the facts I have mentioned have not come under my own eyes, or when they have already been graphically set forth by others, I have preferred, as the more effective and honest course, to quote the very words of the narrators, rather than to give a story of my own founded upon them.

My endeavour has been to put some of the more prominent and interesting characteristics of insect-life into a readable form, to point out some of the best localities for insects, and the methods of

capture, with the hope that the readers will be induced to go and examine the objects for themselves. If I shall have succeeded in this labour of my leisure hours, I may be induced to continue the work; but at any rate I shall be happy to answer any enquiries addressed to me through the post.

THE AUTHOR.

6, Kingswood Place, Lee,

March, 1856.

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§ I.

THE HOUSE.

“ A house retired, convenient, snug,
Not built for ostentation,
But suited to the dweller's means,
And daily occupation.”

ANON.

THE house in Entomology, as in many other things, serves as a base of operations. Here are prepared and kept, not only the instruments of capture, but also the cabinets and boxes in which the products of the chase are stored, and the books by means of which the amusement of leisure hours becomes knowledge and science: the house also serves as a field for collecting, as will shortly be seen. The instruments used in taking insects are few, simple and cheap—important matters to beginners, and especially young ones. Pins of two or three sizes,* a ring-net for butterflies and other flying insects,† a

* The best are the solid-headed, made by Edelsten and Williams, and sold, in London, at No. 1, Crown Court, Cheapside.

+ In the ‘Entomologist's Companion’ I have described as follows a net invented and still made by Mr. Robert Downie, of Barnet, who also makes a very portable, yet strong, sweeping-net (much used by collectors of small beetles, &c.), boxes and other apparatus:—“ Find

stronger ring-net of canvass for water-beetles, a few corked boxes, including two or three small ones for the pocket, a hundred or two of pill-boxes of various sizes, some corked boards for spreading out captures, two or three wide-mouthed phials for beetles, and a pocket lens, and the *beginner* is set up. As the store of insects increases, cabinets or boxes in which to preserve them will be required, but it is better to get them only as they are wanted. The 'Entomologist's Companion' and the 'Entomologist's Annual' contain copious directions for collecting, and they are not expensive books.

a descendant of Tubal Cain that has ability to work neatly in brass, get him to make a figure of Y with brass tube, the trunk two inches and a half long, and five-eighths of an inch diameter, and each arm two inches and a quarter long and three-eighths of an inch diameter. Into one of the small tubes put a tightly-fitting cane, and bend it till it meets the other small tube and forms a pear-shaped ring. For carrying, this ring may be rolled up, so that it will fit into a collector's hat, or better, because firmer when made up, it may be cut into lengths of a foot (more or less), and when wanted for use they may be fitted together by means of pieces of brass tube slightly curved and about four inches long. Then get a lady friend to make a bag-net of book-muslin, rather *larger* than the ring, thirty inches long, and cut so that it hangs perpendicularly at the handle, tapering from the opposite point of the circumference, but rounded at the bottom, *not going to a point*; round the top must be a band of brown holland, into which the cane can slide *easily*. A handle is made by fitting a walking-stick into the large tube.

"This net is very useful for sweeping grass, the edges of bushes or anything that will not catch and tear it; it is also large enough to beat into from furze-bushes or hedges, and its size gives the collector great facility for catching insects on the wing."

Insects of all kinds may be killed by means of laurel-leaves cut into small pieces, and kept in a tin or wide-mouthed bottle. Coleoptera should be pinned through the right wing-case: all other Orders through the thorax.

The proper setting out of specimens is a matter of importance, not only with respect to their appearance in the collection, but also to ensure their usefulness for scientific examination. In their desire to obtain the former qualification, the old race of English entomologists lost sight of the latter; they adopted the method still in general use of setting their Lepidoptera and Hymenoptera with the wings deflected in a curve, so that they touched the paper of the setting-board. By this means not only is the natural aspect of the insects destroyed, but those species that have characteristic markings at the apex of the wings are not easily recognisable. The continental method of passing the pin through the insect so far as to remove it entirely away from the surface of the setting-board, and then spreading out the wings quite horizontally, has the great advantage of placing the specimen in a position more natural, secure and useful. But John Bull, entomological included, thinks his way is always the best—as I very soon found out, when, some years ago, I ventured to publish a few words on flat-setting.* The wings, legs and antennæ must be secured in the required position by slips of strong paper or card and pins, until they are *quite dry*: if the insects are placed in the collection before, they are more liable to become greasy. Whenever this nuisance occurs the insects affected should be immersed in camphine for some hours, then taken out, placed upon blotting-paper for a few minutes,

* 'Zoologist,' 1849, p. 2500.

and covered over with pipe-clay in powder, magnesia or other similar absorbent until dry, when they will come out quite fresh and free from grease.

I suppose the old accusation of the cruelty of killing insects is extinct. It has been disposed of in many ways: it is scarcely worth while to revive the argument for the sake of convincing some one who, at the same time he speaks of cruelty, has no compunctions for the thousands of flies destroyed in his "Ketch 'em alive o'," merely to ensure his own personal convenience.

I assume that my readers have learned so much of Entomology as to know that insects are divided, in accordance with their structure, into Orders; each of these, with one or two exceptions, contains indigenous species sufficient for the study of any individual who has not the whole of his time to devote to Entomology. Yet, although the majority of students will be obliged thus to restrict their attention, it will be well for them to obtain some general knowledge of all the Orders. Whichever Order they eventually elect to study in particular, it will amply repay the closest attention they can give, not only with matter which has interested, and always must interest, all who have eyes to see and hearts to be affected by the displays of beauty and contrivance stored up in these animated minims, but also with species whose natural history is hitherto absolutely unknown to human ken. It is true a popular writer has lately said that the field of Entomology in Britain is fully explored;* but I beg to assure him and his readers that such is not the case, for the chances are that, out of fifty persons who should this year begin to collect insects,

* Rev. C. Kingsley, in 'Glaucus:' 1855.

twenty-five would each discover either a new British species or a new fact in insect economy.

It may be, as it ought to be, asked, "What is an insect?" The popular notion includes under that term spiders, crabs and lobsters, which have some resemblance to insects, but they may be separated at once by the fact that they have more than six legs. A true insect has six legs, four wings and an external skeleton, and undergoes metamorphoses as hereafter explained.

The recommendation of a course of reading, during the long nights of winter, through such works as the first two volumes of Kirby and Spence's 'Introduction to Entomology,' or, as more compendious, Newman's 'Familiar Introduction to the History of Insects,' may well come under the head of this chapter. Either work will give a good general idea of the game to be sought, and the interest that attaches to its capture and subsequent study; and the following pages may, I hope, show that every class of men, in every situation, may find in the natural history of insects a recreation and occupation at once interesting and instructive. Then, when some mild, sunny day heralds the approaching pomp and splendour of the spring and summer, let the learner sally forth to essay his first attempt at practical Entomology.

But while waiting for the favourable spring days, which, in our country, but rarely arrive, seeming to have been expunged from the calendar,—when, for instance, a north-easter makes you feel far below zero, and that it is a purely poetic and aggravating fiction to say,

" May, thou month of rosy beauty !
Month when pleasure is a duty !"

and also at other times, when hindered from out-door search by unfavourable weather, it may be well to devote a little attention to some forms of insect-life that are within the immediate neighbourhood. First in our regard is the cricket,—

“ Little inmate full of mirth,
Chirping on my kitchen hearth,
Wheresoe'er be thine abode
Always harbinger of good.
Though in voice and shape they be
Form'd as if akin to thee,
Thou surpassesest happier far,
Happiest grasshoppers that are;
Theirs is but a summer song,
Thine endures the winter long,
Unimpair'd, and shrill, and clear,
Melody throughout the year.”

Cowper has here combined Natural History and poetry, without any detracting from the latter: with some poets, it would not be difficult to show that the poetry is made at the expense of the Natural History. “Harbinger of good,” however, is scarcely a correct phrase, for the cricket, like many other animals with more sense and fewer limbs, finds out and *goes to* the good things of this world, and is no harbinger where they never exist: he is a consequence, not a cause. The “chirping” is made by the rubbing together of the wing-cases of the males, as has been proved by rubbing them together artificially.

Another sharer of our homes, far more familiar than welcome, is the flea, which, although so long one of man's closest

companions, has a history known with precision to few, and its relations are not yet well made out; in other words, the number of species of fleas is not known, and it is doubtful whether each species is parasitic on one or more animals. Moreover, so anomalous is the structure of the flea, that its proper place in the scale of insects is disputed, some authors contending that it belongs to one Order and some to another. Here, then, is work for observation, and one that would confer no mean honour upon the elucidator.

Fleas love the dark, and their dislike to light, combined with their great muscular power, were the basis of the exhibitions of the "Industrious Fleas," at one time popular in London and other places. I once heard a story which, I believe, has never been in print, and I may here tell it. The sovereign of one of the German states commanded the attendance at court of one of these exhibitions, and the performance of the fleas, some harnessed like horses, and others dressed to represent celebrated human characters, commenced. But soon the exhibitor became perturbed, looked hither and thither, searched through his repository, and stopped the performance, with an apology that one of his chief performers, his Napoleon, had escaped, although he was safe since the acting began. "Where can he be gone?" said the King. The exhibitor looked uneasy, but spoke not. "Tell me," said his Majesty, interpreting his increasing confusion, "what you suspect." "If I may be so bold, your Majesty, I believe he has taken refuge with the Princess H—." "Then," said the King, "search shall be made;" and the Princess retired. After awhile she appeared with a captive, who was immediately put upon the stage. But, oh, horror!

the exhibitor exclaimed, "He is not my Napoleon, he is a wild one!"

In old houses, or in houses where the furniture is old, may often be seen the small brown beetle called *Anobium tessellatum*, or more generally the "death-watch,"—a loiterer among the things of the past,—a reminiscence of the mediæval times. * Then his tick appalled many a stout heart, and even yet, to superstitious minds, is a signal from the world of spirits. But, although it is now well enough understood that this noise is produced by the male as a signal to the female, the subject, curious in itself and its associations, is worth attention and investigation.

Everywhere, "up stairs, down stairs and in my lady's chamber," is the fly. For cool, easy, impertinent familiarity, commend me to the fly. Drive him away from the viands upon which you are engaged, the enjoyment of which he perseveringly disputes with you on your plate, or from your glass, where he sits rubbing his feet (I had almost said his hands), in the excess of his epicurism, and qualifying himself, by gentle sips of your wine, to have an opinion of its quality; flap him with your handkerchief, upsetting your glass and your temper, and driving him on to the fruit at the same time, where, looking through his Argus-eyes, he is making game of you; follow him up, and, if he does not settle on your nose, and you are not too much flurried, observe how he rises into the air boldly and without preparation; put a man to make a leap as high as himself, and he must stoop for the spring to do it; even a bird, although it has wings, must do the same thing; but Herr Fly does nothing of the kind; he only

opens his two wings, and is gone. How? That is something to find out. There have also been many theories and disputes about the means by which a fly walks upon a smooth surface, such as glass, in a vertical position, or runs with his back downwards,—as, for instance, on the ceiling of a room,—and I do not know that the question can yet be considered as determined. Thus, here is another subject for investigation.

Then who does not know the clothes-moth? Ah, but which of these on the window is it? Those! oh, they are not all destructive creatures. This pretty little fellow, with the white head and neck,* comes from a caterpillar that lives in holes and corners, and eats any bits of refuse, and does no harm to any one. This brown fellow† was once a caterpillar with a moveable case, who nourished himself in some dark closet, where he made a living out of old clothes, and a house which he carried about with him. He might be styled the Jew of moths, for he is always to be found, throughout all the stages of his existence, among the “Old Clo’,”—a cry he would doubtless utter if he could. Unlike many a Christian, he has provided well for his children, having taken care they shall have every chance of being well brought up, by having the eggs deposited in a place of plenty. This is the true “clothes-moth.” There is the other sleek yellow-plush gentleman,‡ who sees us looking and is sidling away; he probably spent his time, from youth to maturity, if not under the ermine, yet in as near an approach to it as circumstances

* *Endrosis fenestrella*.

† *Tinea pellionella*.

‡ *Tinea biselliella*.

would permit: he has a dear liking for furs of all sorts, and if he has no regard for the appearance of the skins of other animals, neither has he for his own; for, unlike his congener above mentioned, he makes no covering for his body until he has done eating, when he forms a rude hut in which to assume his robes of state: when he comes out, no one would believe how much dirty work was necessary to procure this finery. In the world there are many parallels.

Everybody has heard of a haunted house: nearly every house in and about London is haunted. Let the doubters, if they have the courage, go stealthily down to the kitchen at midnight, armed with a light and whatever other weapon they like, and they will see that beings, of which Tam o' Shanter never dreamed, whose presence at daylight was only a myth, have here "a local habitation and a name." Scared from their nocturnal revels, they run and scamper in all directions, until, in a short time, the stage is clear, and, as in some legends of *diablerie*, nothing remains but a most peculiar odour. These were no spirits, had nothing even of the fairy about them, but were veritable cockroaches, or black-beetles, as they are more commonly but erroneously termed, for they are not beetles at all. They have prodigious powers of increase, and are a corresponding nuisance. Kill as many as you will, except perhaps by poison, and you cannot extirpate them—"the cry is still they come." One of the best ways to be rid of them is to keep a hedgehog, to which creature they are a favourite food, and his nocturnal habits make him awake to theirs. I have known cats to eat them (the cockroaches, not the hedgehogs), but they do not thrive upon them. The cockroach belongs to the Order Orthoptera,

the insects in which have only a so-called incomplete metamorphosis, and through all the stages of their existence are active and feed. And how they do eat! nothing comes amiss to them; but one article of their food would not have been suspected. The following note thereon was communicated by Mr. Newman to the Entomological Society, at the Meeting in February, 1855:—" '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 bedfellows,' 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." Whether this 'Word for the Cockroach' will reconcile housekeepers to its presence is doubtful; no one likes to acknowledge the existence in his house of "the minor and more odoriferous insect," and the axiom that "the greater includes the less" might here also prove true.

In houses in the country every one must have noticed on summer nights that moths fly to the lights in the rooms. This propensity of moths to be attracted to lights has been taken advantage of by some collectors with the greatest success, many species not otherwise obtainable having been captured in rooms in which a bright light was burning. When collectors become more numerous we expect to hear that those living in open places or in the vicinity of woods employ this method of capture; hitherto it has been used by few, but their success should induce a more extensive trial. In the 'Entomological Magazine,' vol. ii., the Rev. C. S. Bird, of Burghfield, Berks, published an interesting account of his doings in this way, from which I make the following extract:—"During the moonless nights of summer, I sit with a sinumbra-lamp, and perhaps one or two smaller lamps, placed on a table close to the window. The moths speedily

enter the room, if the weather be warm. I have had a levée of more than a hundred between the hours of ten and twelve. In the spring, too, and autumn, I have been frequently fortunate, though generally have my patience sufficiently tried. Of course, at such cool times of the year, the window must be kept shut, till the moths knock for admittance. If at any time of the year a warm mist pervade the air, there is almost a certainty of success. But should any one be induced by this account to try the lamp, he must make up his mind to experience more of unfavourable evenings than favourable. There is, however, this advantage in my sedentary plan of mothing that it can be combined with reading or writing, and the intervals between the arrivals need not be lost.

“ Moths are extremely susceptible of any keenness in the air; a north or east wind is very likely to keep them from venturing abroad. Different species have different hours of flight. Thus, on a mild and dark November evening, *Pacilocampa Populi* will occupy from seven to ten o'clock, after which it will make way for *Petasia cassinea*, which will fly till one or two o'clock in the morning. I have, for experiment sake, sat up in the summer till three o'clock, when the whole heaven was bright with the rising sun, and moths of various kinds have never ceased arriving in succession till that time. Some of these must come from a considerable distance: *Scotophila porphyrea*, being a heath-moth, must come nearly a mile.

“ Moths, like butterflies, have their peculiar modes of flight, by which I can generally distinguish them on their entrance, before I can see their colours. Some announce themselves by a loud knock on the floor; this is the case with

Leiocampa dictæa. Some ascend instantly to the ceiling; as *Agrotis corticea*. Many, I might say the majority, pass the lamp rapidly; and this shows the comparative inutility of using a lamp out of doors, where only those that loiter about it can be taken. Some have a soft and gentle flight; as, for instance, *Cosmia pyralina*, one of my most welcome visitors, whose entrance I am usually made aware of by seeing something drop down on the table, as quick as hail, but as light as a fleece of snow; whilst, on the contrary, the conceited vagaries and absurd violence of *Clisiocampa neustria* are absolutely amusing, and *Cratægi* and *Populi* are nearly as bad. Many Coleopterous insects are attracted; I am sometimes teased by swarms of small gnats, and the house-cricket has once or twice entered; a few common Ichneumons and *Tipulæ* are frequent guests. It may be worth while to say a word on my method of securing my prey. Suppose that, with or without a bag-net, I have imprisoned a moth under an inverted wine-glass, I then light a small piece of German tinder, half the size of a sixpence, or less, and introduce it under the edge, and by means of the smoke the insect is stupefied almost immediately. It is then wholly in my power, though it would quickly revive:—I pierce it; and by means of a pin dipped in oxalic acid, and thrust into the body beneath the thorax, I prevent its revival, and fix it on the setting-board. The German tinder does not injure the colours as brimstone would, whilst it puts the moths so completely in my power for a few moments, that the specimens I thus take and kill are often as perfect and beautiful as if I had bred them.”

The Death's-head Sphinx (*Acherontia Atropos*) some-

times flies into houses at night, attracted by the lights, and causes consternation among the superstitious by the peculiar squeaking sound which it has the power of making. I have in my collection a specimen which flew into the kitchen of the Pavilion Hotel, at Folkestone, in October, 1849, where it not a little discomfited the cooks (no pun is intended), and was eventually captured without injury to them or it.

Several species of moths may be found on the street gas-lamps at night, and I have lately learned that one of our prettiest *Geometrina*, *Ennomos illustraria*, has been taken at Bristol in some plenty, by looking on the ground in the vicinity of the lamps, where the moths appeared like withered leaves. They had no doubt been attracted to the lamp by the light, and had then fallen down suddenly, paralyzed by the glare.

It seems proper, under the head of this chapter, to anticipate a little, and say a word or two about the *Vivarium*.

The most interesting portion of Entomology is the natural history of insects. This, although in its results of great scientific moment, is not Science itself; but it offers a wide field of research, very partially explored, and in which any one can observe. To bring the transformations of insects under notice it is necessary to have the eggs, if possible, or the larvæ as soon after they are excluded from the egg as they can be procured, so that all their changes and the time they occupy, their food, manner of feeding and other habits, until they become pupæ may be seen, and the time and circumstances of the latter change noted. And here it may not

be amiss to say a little upon the nature of the changes that insects undergo. Wonder of wonders is it that a crawling worm, after gorging itself for weeks or months, should then be enveloped in a shroud-like covering, and eventually come forth a creature in no way resembling its former self, but of exquisite delicacy of structure, dressed in the hues of the rainbow, fitted to live in a new element, and, if it feed at all, not touching the substances on which it existed in its former state. The striking similarity of these changes to the life, death and resurrection of man evidently impressed itself on the ancient Greek mind, to which wonder and beauty never appealed in vain, and we accordingly find that one word in the Greek language—*Psyche*—signified both a butterfly and a soul. But these progressive developments are not absolute changes, although they appear to be so to uninstructed eyes, and they proceed, by regular successive moultings of the skin, until the idea of the perfect insect, each species according to its peculiar type, is attained. All insects proceed from eggs laid by the female parent, except in some cases where the eggs are hatched within the body of the mother, and in the case of a few others (*Aphides*, &c.), where the ordinary method of propagation by eggs is supplied for a certain number of generations by a process which has had various interpretations, but which is quite anomalous, and of which more is said hereafter. From the eggs are hatched the larvæ, which, after feeding a certain period, and changing their skins several times, become pupæ. This metamorphosis is the great law of insect-life: it has been classed under two heads—complete and incomplete; but these are not accurate terms, and a better classification is the following:—

“AMORPHA.—In which the penultimate state (pupa) is provided neither with mouth nor organs of locomotion: consequently it neither eats nor moves, nor does it bear any resemblance to the perfect state. This group contains two classes of insects.

“Class I. LEPIDOPTERA; in which the perfect insect has four fully-developed wings, all of them covered with a kind of scales, which are symmetrically arranged on each other, like the scales of a fish or the tiles of a house. The silk-worm, and all moths and butterflies, are examples of this class.

“Class II. DIPTERA; in which the perfect insect has two fully-developed wings, and two merely rudimentary ones, which are distinguished by the name of *halteres* or poisers. The breeze fly, and all two-winged flies, are examples.

“NECROMORPHA.—In which the penultimate state is provided with mouth and organs of locomotion, detached from the body, but so enveloped in a case that it can employ neither. The resemblance, therefore, to the perfect insect is very considerable, except in the total want of motion. This group contains two classes of insects.

“Class III. HYMENOPTERA; in which the perfect insect has four fully-developed wings, all of them transparent or membranous, and without scales. The honey-bee, and bees and wasps generally, are examples of this class.

“Class IV. COLEOPTERA; in which the perfect insect has two fully-developed wings, and two wing-cases which

cover the wings. The sexton beetle and all other beetles are examples.

“ ISOMORPHA.—In which all the states are active and voracious, and of a similar form. This group contains two classes of insects.

“ Class V. ORTHOPTERA ; in which the perfect insect has four wings ; the first pair being leathery, of little use in flight, and often very minute and scarcely apparent ; the mouth is furnished with two strong mandibles, meeting transversely. Crickets and grasshoppers are the examples.

“ Class VI. HEMIPTERA ; in which the perfect insect has four wings, a portion of the first pair being often leathery : the mouth is a tubular sucker formed for extracting the sap of plants. Plant-bugs and plant-lice are the examples.

“ ANISOMORPHA.—In which the Amorphous, Necromorphous and Isomorphous characters appear, together with others not possessed by those groups. This group contains but one class of insects.

“ Class VII. NEUROPTERA ; in which the perfect insect has four reticulated wings. Dragon-flies are examples.” *

For the subdivision of these Classes or Orders, as they are generally termed, I must refer to the work whence the above extract is made.

* Newman's 'Familiar Introduction to the History of Insects,' page 76.

The pupa is the last stage of an insect's life before it becomes perfect, and the period of its duration, like that of the larva, varies from days to years. When the imago, or perfect insect, is matured, it bursts through its pupa-covering, or, in some instances, coverings, and proceeds to fulfil the purpose of its existence, the primary one being that of the continuance of its species. Environed by enemies of all kinds, and subject to innumerable mischances, of the hosts of insects originally called to life, comparatively few attain the ultimate object of their being, the law of Nature in the prodigious multiplication of the members of a species seeming to be rather to ensure the endurance of race than care for individuals, although the latter is not overlooked.

Among all the Orders of insects, the private lives of the Lepidoptera, perhaps, afford the most interesting objects of study; and the caterpillars being mostly eaters of vegetable matter, there is no difficulty in providing and renewing the plants upon which they feed. A garden-pot, half-filled with loose, sandy earth, with a few pieces of cane bent over, and the ends inserted in the pot, this frame covered with gauze, and a string passed over it, below the mouth of the pot, forms a very good cage for caterpillars. A slip of the food-plant should be first placed in a phial of water and put into the centre of the cage, which should be kept in a shady place. According to the size of the caterpillars and the heat of the weather, the food will require to be renewed from time to time. Many of the moths, both large and small, are only to be obtained in this way, being seldom seen in the perfect state, unless, indeed, they are attracted by a light, but then the specimens are often not in good condition, and when once

a Lepidopterous insect loses its scales its beauty is departed, and its use for scientific purposes is greatly lessened. Larvæ of small moths and the young ones of the larger species require to be kept more closely confined, or they would escape. Glass cylinders covered with gauze, and supplied with food like the larger cages, serve well for the young of large species, and the caterpillars of small moths may be reared in the same kind of receptacle, yet it is easier at first to keep them in jam-pots ground flat at the mouth and covered with a piece of glass, for the food remains fresh much longer than in vessels to which the air has access; but the atmosphere becomes too confined to rear the larvæ to maturity therein. Thus provided, "the house" becomes the theatre of performances both comic and tragic;—comic, for the attitudes and doings of the performers are at times very grotesque,—tragic, for they sometimes eat each other up, and, like the Kilkenny cats, only small fragments remain to tell of their existence; whence we deduce the moral to put no more of such sorts together in future. To rear insects of other Orders than Lepidoptera presents some difficulties, from the conditions of their existence, and the disagreeable or disgusting nature of their food, but with vegetable feeders I think much might be done, and there is a great deal to be discovered. Now that the Aquarium has become fashionable, I think it might be turned to account to unravel the mysteries of the early life and education of the numerous species of water-beetles, of which we know next to nothing, and to do this, I believe, would require less attention than the rearing of Lepidoptera.

For an invalid here is never-ending amusement and employment. Some kind relative or attendant could bring, day

by day, the strangers who were to be made at home, and induced to unfold their wonders and glories to admiring eyes. And if no other end were attained than to have cheated sickness, if not of its pain, at least of the attention of the patient, it would surely be worth the endeavour; but I hold that the continued contemplation of such wonders as would be revealed,—the spectator, coming within one remove of the Power in whom we all live and move and have our being,—could not but result in a conviction of the goodness as well as greatness of the Creator, and a consequent elevation of the whole moral nature of the student. A youth impressed with these studies may be called to go upon paths of duty, far removed from all such pursuits, but in pauses by the way, during the journey of life, he will scarcely fail to revert to the happy hours he spent and the reflections that occurred in his early years, and these thoughts may not only help to keep him steady on his path, but encourage him to go on with the hope of being able again to give his favourite studies renewed attention. How many chances of adding to the knowledge of the natural history of the world—to say nothing of physical and commercial benefits—happen, both in common and military life, to men abroad, who, having had in their youth no instruction in the nature of the common things surrounding them, let pass opportunities that ages may not recall. I fear there is not yet a sufficient appreciation of the advantages, individual and national, thus lost, to make Natural History a branch of general education, and in the mean time we can only endeavour to do as much as possible by private teaching and example. The reflex action of the study of Natural History on the individual is greater, and of far higher

importance than the direct action on Science ; the legitimate result of all such reflex action being to cultivate and improve the MAN.

This leads me to make a passing observation on making collections. A collection of insects is to the entomologist what a library is to a literary man,—a repository of matter for reference and information,—and therefore indispensable. Figures and descriptions of insects supply but inadequately, especially to beginners, the place of specimens ; the idea conveyed does not impress itself upon the mind like one derived from the object itself. The number of specimens of each species necessary to be kept depends upon the range of its variation ; no fixed number can be mentioned, it may be averaged at six ; but it may be remarked that several specimens, even when they do not differ, help to give and maintain the knowledge of a species, much more effectively than one or two. - Specimens should be named, arranged, and preserved from damp and mites. Camphor in the boxes or a few drops of oil of cajeput occasionally put in will keep the latter at a distance.

I hope the terms, species, variety, genus, family and order, are understood ; if they are not, there will be no precision of idea when they occur. Let me try to explain.

A *species* is an aggregation of *individuals* proceeding originally from a common origin, and forming a sort or kind of a certain structure, marking, size and colour. All these qualities, however, may vary ; departures, within certain limits, from the recognized type of a species, being called *varieties*. Structure and marking constitute more important specific characters than size and colour. A species, from generation

to generation, always reproduces its like, subject more or less to the variations above indicated; some species offer no varieties, others always have them: but it is rarely that it cannot be determined to what species an insect belongs, especially if it be possible to examine a series of specimens.

A *genus* is an assemblage of *species* possessing the same general characters of structure. A superficial inspection of many insects would induce the belief that they are related, so much do they resemble each other, when a rigid investigation of their structure shows that they are in no way connected.

A *family* is a collection of closely-allied *genera*.

An *order* consists of all the *families* which agree in certain general characters.

•It is true some modern authors tell us there is no such thing as a species as generally accepted, and that if all the species of a genus were extinct except one, all of them could be reproduced from that one. But this idea does not appear to me to be consonant with the law of Nature, as seen in operation in all the varied forms of animal and vegetable life, and although a species may become extinct it is never transmuted into another. The idea of identity and permanence of species lies at the root of all Natural History science: once lose this and we are hopelessly at sea, without rudder or compass, having not only no port to steer to, but no place to start from.

The philosophers who contend against the existence of natural genera have more show of truth on their side; but it is only a show, for Nature has impressed her dies upon certain assemblages of species so unmistakeably that it seems

folly to deny that she has natural genera. If it be intended to be said that the infinite multiplication of genera by authors, founded upon trivial differences of characters, is an error, then I agree, although at the same time it must be admitted that such genera, if of little intrinsic worth, are still of service in the subdivision and recognition of the immense quantity of species of animals in the world.

One unfortunate effect of the squabbles of the leaders of natural science on such matters is that those outside their magic ring,—seeing one set deny there is any foundation at all in Nature for species; and another set, puzzled to tell to which of their restricted genera or orders an animal belongs, cut the Gordian knot by creating a new one,—become impressed with the notion that Natural History is nothing but a jargon of names, are disgusted and turn away. Entomology, however, as well as the other branches of Natural History, *has* its science, and good, hard head-work too it is. To take an insect and determine in succession its Order, Family, Genus and Species, is a task that requires, besides much study and experience, a combination of faculties of no ordinary kind. It is an educational exercise of the mind, nothing, if at all, inferior to a course of mathematics, and from the fewness of its masters it may be judged that it also has its *pons asinorum*. The philosophy of Entomology comprises not only a knowledge of the anatomy and physiology of insects, and their relations *inter se*, but also considerations of the relative position of insects in the scheme of Nature, the laws by which this is regulated, and the influence these numerous though minute creatures exercise in the general economy of Creation.

But let no reader be hereby discouraged. When I first saw a collection of English Lepidoptera I despaired of ever having such a one, forgetting that its accumulation had been a work of time; now I look back and esteem that collection as by no means wonderful. So with the science of Entomology: study it, and the knowledge, coming by degrees, instead of being overwhelming becomes delightful. But, as in other things, there must be the determination to succeed; then, one by one, difficulties vanish, and every step only makes one more anxious to press onward.

I have often wondered that so few medical men are intimately acquainted with Entomology: their science has already gained so many advantages by the study of comparative anatomy, that it is contrary to all experience to think that the field of observation or benefits is exhausted; and I am persuaded that many things in the structure and physiology of man that are obscure may receive a light from the study of the anatomy and reproduction of insects.

For microscopical observers there also is a wide field in Entomology. Much service has been done to Science since the microscope ceased to be used as a toy; but the attention of microscopists seems to be diffused over too many objects; like oil on water, a large surface is covered, but there is necessarily no depth. Perhaps this want of concentration is a natural consequence of the rapid improvement of the instrument, but it appears to me that it is time a connected series of observations were made upon specific subjects. What, for instance, could be more interesting, or of more real service to entomological science, than an investigation of

the variation throughout genera and families, and the modification through the Orders of the parts of the mouth in insects? It is prejudging the question, but I do not think it improbable that the result of such investigations into the structure of the various organs of insects would considerably alter the received notions of what constitutes genera, families and orders.

§ II.

THE GARDEN.

“ Sinuous paths of lawn and of moss,
Which led through the garden along and across ;
Some open at once to the sun and the breeze,
Some lost among bowers of blossoming trees,
Were all paved with daisies and delicate bells
As fair as the fabulous asphodels ;
And flowrets, which, drooping as day drooped too,
Fell into pavilions, white, purple and blue.”

SHELLEY.

IN all ages gardens have been places of great importance, and gardeners, from Adam to Sir Joseph Paxton, although they often knew it not, have exercised no mean influence on the physical and moral welfare of the human race. No better test of the stage of civilization to which a nation has attained need be required than the condition of its gardens: fine natures are always fond of the beauty of flowers, and the extent of this taste in an individual may be taken as an index to the quality of the printing within, whether it be bound in extra calf, gilt and lettered, or only done up in a plain cover. Lord Bacon has not omitted to notice this: in his *Essays*, he says, “ When ages do grow to civility and elegancy men come

to build stately rather than to garden finely, as if gardening were the greater perfection."

The garden being an artificial assemblage of certain plants within a restricted space, there to be cultivated for the sake of their foliage, flowers or fruit, it follows that all the insects attached thereto have thus the conditions favourable to their increase proportionably multiplied and cared for. Some insects accordingly abound in gardens, not only in those attached to mansions in the country, but in those small parallelograms attached to modest suburban residences, which are ironically, or by courtesy, termed gardens, but the number of *species* found is not very great. Many garden flowers, however, are attractive to insects born and bred beyond the boundary wall, and draw them from the surrounding woods or fields: so far a garden is an advantage to a collector, for some of the visitors are rare and not otherwise to be obtained, or at least not without great trouble. I allude more particularly to the Sphingidæ,

"Soft moths that kiss
The sweet lips of the flowers and harm not,"

hovering over them, *Petunias* especially, in some years in great abundance. I suspect that if gardens near the south-coast were attentively watched on summer evenings the number of our native species of Sphingidæ, at present very small, might be increased, and some of the rarer species of the family be more often taken than they are at present.

Did you ever see a Sphinx fly? There is nothing to compare its motion to, except a flash of lightning. While you are looking at a flower in the twilight, between you and it

glides a motion, a moving haziness, which is before you and yet conveys to your eye no definite image. Before you have half thought what it can be, you see the flower again distinctly, and rub your eyes, thinking there must have been an illusion, or possibly an unsteadiness of vision caused by the irritation of that gnat that was buzzing about your head; when, lo! the flower just beyond seems to shiver,—you move to see what is there, but there is a move before you, and a dim shadow flits away like a thought. Can it be anything real? Stand still awhile: and now, in the increasing gloom, as you bend over the *Petunias*, holding your breath, you see a darkness visible drop down before you, but its presence is better made known by the humming caused by the rapid vibration of wings. Stir not, or this ærial body will float away. Now you see it deigns not to alight or touch the margin of the chalice, but, poising itself in air, stretches out its long tubular tongue and quaffs the nectar at the bottom. Now or never, if you wish to catch it. Strike with your ring-net rapidly below the flower, raising your hand and turning your wrist at the same moment. There you have it—*Sphinx Convolvuli*! Look, what a living glory, its eyes like stars brought down for us to look into, and behold, we can see nothing but light. But if you wish to see the other beauties of your captive to-morrow, you must kill it: first stop its fluttering by a pinch on the under side of the thorax, and then a dose of oxalic acid on the point of a needle will put it *hors du combat*. It has lost a little of its lustre by struggling in the net, as might have been expected; the scales on the wings of all *Lepidoptera* being easily rubbed off, but it is as good a specimen as is usually got in this way:

perfect ones are rarely obtained, except by rearing them from the caterpillar, and such rare species as this are seldom found in their early states.

The directions given for taking this Sphinx with the ring-net will serve for taking other insects on the wing, observing as a general rule to proceed with the utmost quietness and caution. In aiming at a moth or butterfly hovering over a flower, remember *to strike upwards*, for as the insect will be almost sure to have taken alarm at your first movement, and will probably rise, your best chance of catching it is to strike upwards, and if it still maintains its position at or on the flower, the lower edge of the ring should still be low enough to include it. In Germany the favourite instrument for taking large Lepidoptera on the wing is a large ring-forceps covered with brass wire-gauze, but it must require considerable practice and dexterity to catch a Sphinx when flying. There is, however, this advantage in the method, that such an insect once within the circumference is held fast and sustains but little injury. By all means try the plan, if you think proper, and may your specimens be finer than mine!

Honeysuckle, "lush eglantine," as Shelley calls it, that lovely plant that ornaments many a cottage-door, and an especial favourite with the poets, is also honoured, when in bloom, with the attentions of many moths, Sphinges included. *Sphinx Celerio*, the Humming-bird Sphinx (*Macroglossa Stellatarum*), which revels in the sun-shine, *Plusia bractea*, and many other species of moths, feed upon the honey of its blossoms, and may be caught while flying round them, especially in the evening. The larvæ of a small moth, *Gelechia Mouffetella*, roll up the leaves and feed

thereon in May, but they are fonder of uniting two leaves with a white, silken web, each larva making for itself a closely-fitting tubular dwelling, out of which it moves at either end with great facility if disturbed.

The red valerian (*Centranthus ruber*) is one of the most attractive plants to *Noctuidæ*, and all through the summer an observance of it at dusk, and afterwards by means of a lantern, will be rewarded by many species. The moths settle on the flowers and may readily be caught in a net held under them or in large pill-boxes. One of the latter, about an inch in diameter, should be put with one hand at one side of the moth, or under it, if it be at the side of a flower, and the lid be put on quickly with the other hand, so as to enclose the insect; the bull's-eye lantern, in the mean time, hanging suspended by a string from the neck of the operator. The moths may be killed by being placed, boxes and all, in a tin or other close wide-mouthed vessel half filled with laurel-leaves cut into small pieces; in this they should remain for twenty-four hours at least, by which time the muscles of the wings, which at death become very rigid, will be relaxed, and the moths may then be pinned and easily spread out on the setting-boards to dry. If it be not convenient to pin and set the moths for several days, it will be rather an advantage than otherwise to let them remain. The laurel-leaves will be effective for killing for some months, as the prussic acid therein prevents the decomposition of the leaves, provided they have been gathered in a dry state, and not very early in the year; for if old leaves be taken then, they do not contain sufficient prussic acid to counteract decay.

Jessamine, when in flower, is very attractive to moths, and is the favourite haunt of the humming-bird Sphinx, which feeds by sipping the honey without alighting, hovering below and turning its long tongue upwards into the drooping flowers. As this elegant creature feeds by day, a good idea of the habits, on the wing, of the Sphingidæ in general may be formed by watching its rapid and elegant motions.

The flowers of rhododendrons are much resorted to in the evening by the large and small elephant/hawk-moths (*Deilephila Elpenor* and *D. Porcellus*), and also by some of the *Noctuina*.

As a general rule, flowers that are attractive to bees and butterflies by day are also attended by moths at night, but there are exceptions; mignonette, for instance, which is covered with bees in the sunshine, but no moths come to it during the hours of night. And that queen of flowers, the rose, the favourite of the garden in all ages and climes, of which poets without end have sung the praises, and of which Shelley so exquisitely says,

“ — A rose embower’d

In its own green leaves,

By warm winds deflower’d,

Till the scent it gives,

Makes faint with too much sweet these heavy-winged thieves;”

this beautiful flower, strange to say, is not a favourite with many of the day or night rovers. I do not remember any insect of note which is attached to the *flowers*, except the rose-chaffer (*Cetonia aurata*), which is often found buried among the petals; but the leaves are the especial food of

the caterpillars of a small moth (*Coleophora gryphipennella*), which eats out the parenchyma or fleshy substance between the upper and under skins, leaving white spots on the upper side of the leaves at the places where it has fed. But, not content with this, it makes a covering for its body from the leaves, using as much as it wants of the upper skin only for its wrapper, which it folds round itself in the most fitting style, leaving one end open, through which it protrudes the head and segments bearing the legs: thus attired it walks about, always carrying its clothing with it, which, as the tenant grows, is increased from time to time by additions of more leaf. Comical things these moving cones appear! always seeming to be in danger of toppling over; but this rarely happens, and if by accident the caterpillar loses its hold it does not fall, but swings down gently by a silken thread kept in readiness for such accidents. When it has done eating the larva turns round, and the change to the pupa state is made within the case, it being first made fast to a leaf, stem or other firm substance; and when the moth emerges, it does so with so much caution and so neatly that there is no sign to the beholder that it has escaped, so that it frequently happens, the collector, finding a case, and thinking he has a prize, gets nothing but disappointment for his pains. There are many other species of this genus of moths, which feed on various plants, and of which I have more to say hereafter.

On the rose-leaves, or rather *in* them, live the larvæ of *Nepticula anomalella*, a moth belonging to a genus of the smallest known Lepidoptera, the largest species in it not being more than a quarter of an inch in expanse when the

wings are spread out, and the smallest being less than one-sixth of an inch. The larva of our species feeds entirely within the substance of the leaf, making long, tortuous galleries, which turn brown, and are very conspicuous on the green surface of the leaf. The larva state does not last many days, and when the larva is full fed it comes out of its gallery, and makes a tough, brown, silken cocoon in which to undergo its change to a pupa, fixing it in the furrow of the footstalk of the leaf. This situation, however, would not avail for the autumn brood (there are two broods in the year), because the imago state is not with it assumed until after the lapse of winter, and there would be no security in such a place when the leaves had fallen, so the autumn feeders fix their cocoons in crevices of the bark or stem, or in some adjoining place of safety. Unlike the genus *Coleophora* above mentioned, when a perfect insect of this genus emerges from its cocoon, it leaves the pupa skin projecting half way therefrom; but as the cocoons are seldom found by collectors on account of their smallness, this indication of its exit is not often made serviceable to assure them that their expectations are at an end. This species and another (*N. angulifasciella*) feed also on the leaves of the wild roses.

Rose-trees are infested by the larvæ of several species of Tortrices, which roll up the leaves with silken thread and eat them at their leisure, often attacking the buds also. There is no efficient remedy but to pick them off as soon as discovered: if left, they are sometimes so numerous that they destroy all the blossoms while in the bud.

On the rose also, *Aphides*, or plant-lice, live and batten on its juices; frequently assembling in such numbers that every

leaf and bud is literally covered with them, and the development of the flowers is totally prevented.

Several other plants besides roses are infested and injured by Aphides; the injuries they do would be much more extensive if the depredators had not natural enemies, such as the lady-bird, both in the larva and pupa state, the larva of the lace-wing fly (*Chrysopa perla*), and the larvæ of the flies called *Syrphi*. These latter, which may be seen wherever Aphides are, are blind, footless grubs, hatched from eggs deposited by their parents in the midst of their prey. But although without eyes and feet they are not helpless, but soon clear away all the Aphides within reach of their flexible bodies. Very interesting is it to watch them doing so much service with so little exertion.

The generation of Aphides is one of the most wonderful things in insect-life. Dr. W. T. Burnett has recently put forth a theory on this subject,* which has engaged the attention of observers and physiologists for nearly a century, and has had several explanations, none of which have been deemed satisfactory. He says, "the brief history of the general conditions of the development of these insects is as follows:—In the early autumn the colonies of plant-lice are composed of both male and female individuals; these pair, the males then die, and the females soon begin to deposit their eggs, after which they die also. Early in the ensuing spring, as soon as the sap begins to flow, these eggs are hatched, and the young lice immediately begin to pump up sap from the tender leaves and shoots, increase rapidly in

* 'Silliman's Journal' for January, 1854, quoted in the 'Zoologist,' 1854, p. 4487.

size, and in a short time come to maturity. In this state it is found that the whole brood, without a single exception, consists solely of females, or rather, and more properly, of individuals which are capable of reproducing their kind. This reproduction takes place by a viviparous generation, there being formed in the individuals in question young lice, which, when capable of entering upon individual life, escape from their progenitors, and form a new and greatly increased colony. This second generation pursues the same course as the first, the individuals of which it is composed being, like those of the first, sexless, or at least without any trace of the male sex throughout. These same conditions are then repeated, and so on almost indefinitely, experiments having shown that the power of reproduction under such circumstances may be exercised, according to Bonnet, at least through nine generations, while Duvau obtained thus eleven generations in seven months, his experiments being curtailed at this stage, not by a failure of the reproductive power, but by the approach of winter, which killed his specimens; and Kyber even observed that a colony of *Aphis Dianthi*, which had been brought into a constantly heated room, continued to propagate for four years, in this manner, without the intervention of males, and even in this instance it remains to be proved how much longer these phenomena might have been continued."

Dr. Burnett made a series of experiments with Aphides, in order, if possible, to elucidate the anomalous method of their reproduction, all of which he has detailed. He found that the individuals of each generation, except the first, were produced within the body of the parent from a primitive

egg-like capsule, which he calls a "germ," and shows is not a true egg in structure, nor has it the same conditions of development as occur with ovo-viviparous insects; and he comes to the conclusion that there is "no alternative but to regard such capsules as *buds*, true *gemmae*, which sprout from the inner surface of the *Aphis*, exactly like the buds from the external skin of a *Polype*."

After a review of the theories of several authors on the subject, and more particularly those of Owen and Steenstrup, showing they are all untenable, Dr. Burnett continues:—"Viewed in this way, the different broods of Aphides cannot be said to constitute as many true generations, any more than the different branches of a tree can be said to constitute as many trees; on the other hand, the whole suite, from the first to the last, constitutes but a single true generation. I would insist upon this point as illustrative of the distinction to be drawn between *sexual* and *gemmaiparous* reproduction. Morphologically they have, it is true, many points of close resemblance; but there is a grand physiological difference, the true perception of which is deeply connected with our highest appreciation of individual animal life. A true generation must be regarded as resulting only from the conjunction of two opposite sexes—from a sexual process in which the potential representations of two individuals are united for the elimination of one germ. This germ-power may be extended by gemmation or by fission, but it can be formed only by the act of generation, and its play of extension and prolongation by *budding* or by division must always be within a certain cycle, and this cycle is recommenced by the new act of the conjugation again of the sexes. In this way

the dignity of the ovum as the primordium of all true individuality is maintained; and the axiom of Harvey, *omne vivum ex ovo*, stands as golden in physiology. The buds may put on the dress and the forms of the ovum, but these resemblances are extrinsic, and, in fact, only an inheritance from their great predecessor.

“The terminal brood has hitherto been considered, as far as I am aware, to be composed exclusively of males and females, or, in other words, of perfect insects of both sexes. I was surprised, therefore, on examining the internal organs of the non-winged individuals, to find that many of these last were not females proper, but simply the ordinary gemmiparous form. Moreover, so great was the similarity of appearance between these two forms—true females and gemmiparous individuals—that they could be distinguished only by an examination of their internal genitalia. Among the proper females there were, besides those which were filled with eggs or had already deposited them, other individuals in which the ovaries were but feebly developed, or at least in which no mature eggs had been formed. An opportunity was thereby afforded me to examine the structural differences between the true ovaries and their *quasi* representatives, the bud-like processes. The true ovaries had their usual well-known structure, multilocular tubes containing nucleated cells, which are probably the undeveloped germs; the bud-like processes, on the other hand, consisted of a row of cell-masses, oval and connected by a kind of peduncle. These wide differences have more than ever persuaded me of the morphological dissimilarity of these two kinds of reproducing parts in this animal. It seems to me, then, that the real

intrinsic difference between an ovum and a bud lies as deep as the conditions of sex itself, notwithstanding the latter often has, as in the present case, for instance, some of the morphological characteristics of the former."

The species of *Aphis* on which Dr. Burnett made his observations was not that of the rose, but as the peculiarities of reproduction have been noticed in more than one species of *Aphis*, there can be no doubt that one general law applies to all of them. The species being very numerous and common, there is a wide field of observation for those who are desirous to trace phenomena to the operation of general principles. Referring to the variation in the number of broods, between the first and the last, observed in the same species of *Aphis* in different years, due apparently to changes of temperature, Dr. Burnett says, "There are many other facts in insect-life that indicate in like manner some direct relation between temperature and nutriment and sexual development. The subject is as important as it is interesting in physiology, and these very animals will perhaps subserve the successful study of the primary morphological conditions of sex." Will not some one take up the matter, and work at it with reference to this end?

I will only mention one more insect which is attached to the rose—the leaf-cutter bee (*Megachile centuncularis*). The leaves of rose-trees may frequently be seen with a circular piece cut out of them, and by watching awhile, the living cause of these notches will probably be seen operating. Placing itself on the edge of the leaf so that it passes between its legs, with its mandibles it cuts out a circular piece quickly and with accuracy, poising itself on its wings

when near the termination of its labour, in order not to tear the piece, and that, when completed, both itself and the portion of leaf may not fall to the ground. When quite detached, the piece required, held firmly between the legs of the bee, is carried to its nest, where, with other similar pieces, it is used to form a cell, several layers of leaves being required. When the cell is completed, the bee collects a store of honey and pollen, which she places at the bottom, and then lays thereon a single egg; she then covers the opening with pieces of leaf cut to fit it exactly, and proceeds to construct other similar cells above it. These nests are generally constructed in holes bored in decayed wood, at least in such places I have found them, but they are said also to be made in cavities in walls and in holes in pathways. The whole of the proceedings of this bee afford most interesting examples of the adaptation of means to ends to be found in insect economy.

This seems to be the proper place to refer to the honey-bee, but as the wonders of its natural history have been the object of so many observations, and the subject of books without end, I shall do no more than allude to them. The doings of these insects alone are a study for any one who has leisure and opportunity to attend to them, and bees, considered with a reference to their produce, deserve a more general attention than has been bestowed upon them in this country, for the supply of native honey is not equal to the demand, and, in consequence, large quantities are annually imported. Mr. Desborough has communicated to the Entomological Society the result of a series of experiments and observations made to determine the duration of life in the

queen, males and workers of the honey-bee; his paper has a practical value for the bee-keeper, and it forms the Prize Essay of the Society for the year 1852.* The largest of our Sphingidæ, *Acherontia Atropos*, has been found in bee-hives, attracted thereto probably by the scent of their sweets. But more formidable, although smaller insects, are the caterpillars of two moths, *Galleria mellonella* and *Achroea alvearia*, which make galleries through the honey-comb, and are said also to eat the honey; they, however, certainly cause the destruction of the bees.

Earwigs are amongst the most numerous and destructive agents in gardens, for they devour the petals of the flowers of many plants. Dahlia flowers are a favourite food with them, as every cultivator well knows, and many plans are used to entrap and destroy them. In structure these insects are very peculiar: they do not associate well with any others, and modern authors have raised them to the rank of a distinct Order (*Euplexoptera*, Westwood). Earwigs are still the dread of the million, although enough is known to assure us that the name is a misnomer, and their injurious effects on man's aural organs a fable.

The lilac and privet, both well known garden shrubs, afford food to several of our native Lepidoptera in their larva state; among which may be mentioned *Sphinx Ligustri*, *Pericallia Syringaria* and *Gracilaria Syringella*. The larvæ of the last species at first live in companies, sometimes amounting to twenty or thirty in number, between the upper and under skins of a leaf, feeding upon

* Published in the 'Transactions' of the Society, and in a separate form by Longman and Co.

the fleshy pulp. But, like some human families, they do not long agree under one roof, and each individual moves out and sets up a home for itself, removing several times to similar habitations until it assumes the pupa form.

Fuchsias, now the ornament of every garden, although originally natives of South America, have this year (1855) been selected in many places for the food of the larvæ of one of our scarcest Sphingidæ, *Deilephila Galii*, although at the same time other larvæ of the species have been found upon their more usual and plebeian food "lady's bedstraw" (*Galium verum*) in unusual numbers.

The laburnum, or golden rain, as the Germans most expressively call it, in reference to its beautiful pendant blossoms, has its leaves disfigured by white blotches made twice a year by the larvæ of *Cemiosstoma Laburnella*, the moths produced from them being shining, silvery atoms, figured and described in the 'Natural History of the Tineina,' vol. i.*

Snapdragons (the varieties of *Antirrhinum*) are frequented by several species of wild bees for the sake of the honey and pollen the tubular flowers contain. Mr. Newman communicated to the Entomological Society† some notes, showing that different species of bees adopt different methods to obtain the honey and pollen. "One species (*Megachile centuncularis*) alights on the upper lip of the flower and crawls into the mouth with its back downwards; the hairy pollen-brush of its abdomen is closely appressed, by the elastic spring in the under lip of the flower, to the hairy

* London: Van Voorst. 1855.

† Proceedings Ent. Soc., 1850, p. 37.

interior surface of the upper: by this means the pollen is brushed from the anthers and received by the pollen-brush of the bee, and also by the hairy interior surface of the upper lip of the flower: as this bee disappears within the corolla it is fair to assume it sips honey from the nectary, as well as gathers pollen from the anthers, thus accomplishing a double purpose in its visit."

"Another species (*Bombus* ———?) invariably alights on the *lower* lip of the flower, which it enters with its back upwards: the mesothoracic sections press the anthers against the hairy surface above alluded to, and there remains on the mesothorax of the bees a yellow stripe of pollen, which, however, does not appear to be a desideratum, but, on the contrary, rather an annoyance, as the bee will often settle on a leaf, and, passing its fore legs over its alary segments, try to scrape or brush away the pollen which clings there. Although the mouth of the corolla is greatly distended as the bee enters, still the presence of the latter, when entirely within the tube, is not perceptible.

"A third species (*Bombus* ———?) alights on the common flower-stalk, just below the flower, and with its sharp, scissors-like mandibles cuts a hole in the corolla, close to the nectary; cutting the aperture is scarcely the work of a second: when accomplished, the tongue, or rather the labial apparatus, is immediately thrust through the aperture, and the delicious liquid abstracted: it frequently, indeed *most* frequently, happens, that the honey has been already consumed by one or other of the species already noticed, and the difference in the bearing of the bee is very remarkable: when disappointed, she immediately flies away with a sharp

angry hum, as though out of temper; but when successful she imbibes the nectar with much more deliberation and apparent satisfaction, and makes a kind of purring noise, probably with her wings, while engaged in the agreeable occupation: having finished the task, she strokes her head and antennæ with her fore feet, somewhat as a cat washes her face; and rests at least a minute before seeking another meal."

Mr. Newman also observed that the same individual bee never tried the same flower twice. He says, "Even though it shall have sipped at fifty of these little fountains of nectar between two of its visits to any particular flower, and though on the second visit it shall approach that particular flower quite as eagerly as on the first, yet it is simply a visit of enquiry, as it invariably leaves the flower, without the slightest attempt to enter it a second time. Now how does the bee ascertain that the sweets of the flower have already been rifled by herself? What organ of sense aids her in making the discovery? Certainly the fact of the honey having been abstracted is not perceptible, for I watched a bee enter every one of six flowers on a plant, and, in the space of a few minutes, another bee did the same, and then another and another: as many as fifteen or twenty bees will occasionally come to an isolated plant within an hour, and the last comer will not appear aware of the previous visits; and yet the *same* bee never opens the *same* flower twice."

I have quoted this account to show how much interest there is in, and how much original observation may be made on, the most familiar insects. There is no place in which the economy of insects will not afford some circumstance for

investigation, and which, probably because it is common, has been overlooked.

In all suburban gardens may be found the caterpillar of the vapourer moth (*Orgyia antiqua*), curiously ornamented with hairy tufts of different lengths and colours. It is omnivorous : I do not think there is a tree or shrub on which it will not feed : I have even found it eating the leaves of the common laurel, a plant which scarcely any other insect touches. The vagaries of the perfect insect are very pleasant to behold, as it wends its eccentric though onward flight during the brightest sunshine, and goes, like the pig described by Leigh Hunt, "up and down all manner of streets." It is a truly cosmopolitan insect, found in the country, and yet quite at home in town, haunting country lanes and frequenting London streets, loving sunshine and yet not disdaining a smoky atmosphere. But this is true only of the male, for while he is gaily roaming about, visiting the abodes of men, and looking down upon their doings, as if to deserve the name that has been applied to him of "a regular street insect," his dingy wife, without wings and without an idea beyond her home, sits quietly minding her domestic affairs — certainly, in her case, her "mission." Thrifty is she, too ; she gads not about, like other lady-moths, dropping their eggs at random, or ensuring the isolation of their children by laying their eggs far apart—but, knowing her progeny will agree well together, she places her eggs on the outside of the cocoon in which she passed the dreaming hours of her pupa existence, thus making it serve a double purpose, and there she remains as long as she lives. Is there not some parallel to this history among the

individuals of a higher species of animal who little suspect how humble a prototype they have?

One more example of a cockney insect, and I pass on. Often in May *Biston hirtarius* may be seen in numbers on the trees in the squares of London; indeed I know no other locality in which they are so common. The caterpillars doubtless feed on the leaves of the trees where the moths are found: why the parents selected such a smoky atmosphere in which their children should be born and bred is not to be surmised; but wonder may cease when we know that creatures with larger heads, and, it would be thought, more brains, act in a very similar manner with regard to their offspring.

All the cabbage tribe are infested by the caterpillars of the "Garden-white" butterflies (*Pontia Brassicae*, *P. Rapæ* and *P. Napi*), and to such an extent in some seasons that the plants are quite destroyed. These larvæ are also very fond of Nasturtiums and *Tropæolum Canariense*. The pupæ of these butterflies may always be found in winter suspended on palings, under the coping of walls, and in similar situations where shelter is to be obtained. The cabbages are also devoured by the caterpillars of *Mamestra Brassicae*, a large moth belonging to the family Noctuidæ.

Thinking of the beauty of butterflies has reminded me of Leigh Hunt's charming 'Essay on Butterflies,'* in which he quotes a poem of Spenser, describing a butterfly bound upon his day's pleasure. His journey is set forth with all the rich embroidery of language so peculiar to Spenser. Being

* In the 'Indicator,' chap. lxiv.

“ready dight; unto his journey he did himselfe addresse
the fields, the woods, the rivers and the medowes greene,
with his aire-cutting wings he measured wide,” until he
arrived at the “gay gardins,” then, he

“Round about doth flie,
From bed to bed, from one to t’other border;
And take survey, with curious busy eye,
Of every flower and herbe there set in order;
Now this, now that, he tasteth tenderly,
Yet none of them he rudely doth disorder,
Ne with his feete their silken leaves deface,
But pastures on the pleasures of each place.

“And evermore, with most varietie,
And change of sweetness (for all change is sweet),
He casts his glutton sense to satisfie,
Now sucking of the sap of herbe most meet,
Or of the dew, which yet on them doth lie;
Now in the same bathing his tender feet:
And then he percheth on some branch thereby,
To neatten him, and his moist wings to dry.

* * * * *

“And whatso else of vertue good or ill
Grew in the gardin, fetched from far away,
Of every one he takes and tastes at will,
And on their pleasures greedily doth prey.
That when he hath both plaied, and fed at fill,
In the warme sunne he doth himself embay,
And there him rests in riotous suffisaunce
Of all his gladfulness, and kingly joyaunce.”

“ Nothing, it might be supposed, could be said after this : and yet the poet strikes up a question, in a tone like a flourish of trumpets, after this royal dinner :—

“ What more felicitie can fall to creature,
Than to enjoy delight with libertie,
And to be lord of all the workes of Nature ?
To reign in the aire from th' earth to highest skie,
To feed on flowers, and weedes of glorious feature ?
To take whatever thing doth please the eye ?
Who rests not pleased with such happiness,
Well worthy he to taste of wretchedness.”

“ But,” says Leigh Hunt, “ when are human beings to be as well off in that matter as the butterflies ? or how are you to make them content, should the time come when they have nothing to earn ? However, there is a vast deal to be learned from the poet's recommendation before we need ask either of those questions. We may enjoy a great deal more innocent ‘delight with libertie’ than we are in the habit of doing ; and may be lords, if not of ‘all the workes of Nature,’ of a great many green fields and reasonable holydays. It seems a mighty thing to call a butterfly ‘lord of all the workes of Nature.’ Many lords, who have pretensions to be butterflies, have no pretensions as wide as those. And, doubtless, there is a pleasant little lurking of human pride and satire in the poet's eye, notwithstanding his epical impartiality, when he talks thus of the universal empire of his hero. And yet how inferior are the grandest inanimate works of Nature, to the least thing that has life in it ! The oaks are mighty, and the hills mightier ; yet that little participation of the higher

spirit of vitality, which gifts the butterfly with locomotion, renders him unquestionable lord of the oaks and the hills. He does what he pleases with them, and leaves them with a spurn of his foot.

“Another beauty to be noted in the above luxurious lines, is the fine sense with which the poet makes his butterfly fond of things not very pleasant to our human apprehension—such as bitter herbs and ‘rank, grassy fens.’ And, like a right great poet, he makes no apology for saying so much about so little a creature. Man may be a very little creature to a very great apprehension, yet we know what a world of things he contains; and all who partake of his senses are sharers of his importance. . . . Homer draws his similes, as Jupiter might have done, from some of the homeliest animals. The God made them, and therefore would have held them in due estimation: the poet *re-makes* them, and therefore contemplates them in a like spirit. . . .

“After all, Spenser’s picture of the butterfly’s enjoyment is not complete, entomologically. The luxury is perfect; but the reader is not sure that it is all proper butterfly luxury, and that the man does not mix with it. The butterfly, perhaps, is no fonder of ‘bathing his feet,’ than we should be to stick in a tub of treacle. And we ought to hear more of his antennæ and his feathers (for his wings are full of them), and the way in which they modify, or become affected by, his enjoyments.

“But, on the other hand, the inability, in these sympathies with our fellow-creatures, to divest ourselves of an overplus of one’s human nature, gives them a charm. We

cannot leave our nature behind us when we enter into their sensations. We must retain it, by the very reason of our sympathy, and hence arises a pleasant incongruity, allied to other mixtures of truth and fiction."

This writing contains matter of more service to Entomologists than is at first apparent.

The asparagus is the prey of a pretty little beetle, *Crioceris Asparagi*. It devours the leaves and the rind of the stems, and frequently exists in such abundance that it does extensive injury.

Many ground-beetles (Geodephaga) inhabit gardens, secreting themselves during the day, and roaming about at night. They should not, as is too commonly the case, be wantonly destroyed, for, as they are all eaters of caterpillars, they are among the gardener's best friends.

Among the strawberries may often be found the hairy and very active caterpillars of the garden tiger-moth (*Arctia Caja*). As they eat many things besides strawberry-leaves, weeds as well as cultivated plants, I do not think they can be deemed very noxious, but if the garden be kept very clean, as they have most voracious appetites, they may do considerable mischief. But you need not tell the gardener to destroy them, for, as everything that crawls, comes under the head of vermin, he is sure to put his foot upon every one that he sees. He is no solitary example of what is meant by "jumping to a conclusion," but the ignorance of insect economy among the class to which he belongs, although the opportunities of becoming acquainted therewith are so numerous and constant, is wonderful. These caterpillars, hatched in the autumn, live through the winter's cold and

rain without feeding, but at the earliest warmth of spring become active, and ever after do their best to make up for lost time by eating incessantly. In June they become pupæ, first making for themselves a slight web among loose matters on the surface of the ground, and after remaining quiet for a few weeks the perfect moths come out in all their beauty.

Arctia Menthrasti and *A. lubricipeda* are also regular gardeners, and their hairy caterpillars may be seen crawling about commonly enough in the month of September. Unlike their near relative, *Caja*, they get rid of their cares with the summer, and pass into the pupa state beneath the surface of the earth before the winter begins.

“Who loves a garden loves a greenhouse too,”

says Cowper, but although the cultivator of plants may shut out wet and cold from his favourites, he cannot exclude their insect enemies. Aphides and earwigs go there with them, and prove as hurtful as they do out of doors. *Thrips* is well known to every one who has a greenhouse, but that it is an insect of very anomalous structure few plant-growers are aware. The Thripides are related to several Orders, Neuroptera, Orthoptera and Homoptera, but possess some characters differing from those of each; and Mr. Haliday, one of our most philosophical writers, with whom these insects have been subjects of special attention, has cut the Gordian knot of the difficulty by erecting them into a distinct Order called Thysanoptera. Gardeners slay these insects in greenhouses and hothouses wholesale by means of tobacco-smoke, with which they fill the building.

Since the cultivation of ferns under glass became fashionable, Mr. Newman, one of the most successful cultivators and illustrators of this tribe of plants, has discovered that the larvæ of one of the weevils, *Otiorhynchus sulcatus*, do the ferns great injury by feeding within the caudex, and he has communicated a detailed account of these larvæ and their doings to the Entomological Society.*

Mr. Newman has also communicated to the Entomological Society,† a note on the damage caused to ferns by a minute Hemipterous insect, *Typhlocyba Filicum*. He says, "It inserts its strong, short and acute rostrum into the parenchyma of the frond, and remains for days in one position, apparently engaged during the whole time in extracting the sap, after the manner of an *Aphis*. The result of this abstraction of the juices of the plant is not, as in the case of the *Aphis*, a distortion of the leaf, but the production of whitish or yellowish spots or blotches, which increase in number and size until the entire frond is permanently, although not uniformly, discoloured. The injury is committed by the insect in all its stages; but as its growth to maturity is extremely rapid, and as its life in the imago state is usually prolonged, it follows that the injury caused by the insect in its perfect, is much greater than that in its preparatory states."

Here, then, are more examples of the great interest attaching to the observation of the natural history of insects continually under our very eyes: others will present themselves to those who seek for them.

* Proceedings Ent. Soc., 1855, p. 100.

+ Id., 1853, p. 132.

§ III.

THE ORCHARD AND FRUIT-GARDEN.

“ The downward orchard, and the melting pulp
Of mellow fruit, the nameless nations feed
Of evanescent insects.”

THOMSON.

A WALK in an orchard, full of old fruit-trees, sets me thinking of the monasteries and the monks, who employed their leisure hours in cultivating apples, pears and other fruits, relieving the monotony of their existence by the mysteries of gardening, and varying the austerity of their fare by the produce of their grafts and seedlings. To their care we doubtless owe the preservation, if not the introduction, of some of our finest fruits, and I cannot but think that the natural history of the insects of the orchard also assisted to divide the attention of these holy men with studies of the fall of man by means of an apple, and such like theological questions. But it was not the fashion then to occupy parchment with the doings of such tenants of their estates, at least such proofs of their Natural-History lore have not been transmitted with the other records of their learning to our time, and our modern rural population has

not preserved any traditions of their knowledge, if such they had, of the insect enemies of their fruit-trees. Or is it true that the present popular belief in blights has descended from these old cultivators, and is it possible that they knew no more about such things than our present race of farmers?

Blight is a word used in the country to designate the all-sufficient cause of the failure of crops, of fruit in particular. Try and persuade a farmer that the millions of insects which ravage his orchard and fields are produced by ordinary generation from a preceding similar race; and he thinks you want to humbug him. He is not to be "done" that way; not he, indeed! Did he not see the blight come in the air? Were not all his trees and fields clear one day and swarming with the "varmint" the next? How else could they come, but in the air?

Such a state of things would be laughable if the consequences were not serious. How many crops are lost annually in consequence? for, without a knowledge of the natural history of the insects causing the damage, even when the farmers are convinced that it arises from insect attacks, they may do more harm than good in endeavouring to stop them. All the accruing loss has to be borne by the people at large, either in privation or an enhanced price, and, as a great part of the loss might often be prevented if the people were better taught, the teaching of the principles of Natural History, and their application to the daily business of country life, should surely form part of the education of our rural population. But those who have the direction of instruction have themselves no knowledge of such "common things," and until they have it is in vain to expect that the people at

large can be taught them. But even if our governors were aware of the value of such knowledge, there are other obstacles in the way. The Church Catechism and the Westminster Confession of Faith have no necessary connection with fruit and grain crops, and yet the people cannot be taught how the latter grow and why they sometimes fail from the attacks of "blight," because those in a higher station cannot agree about the form of theology—religion it is not—in which they shall be instructed. Shall we ever be a wise nation?

Not only is the fruit of the apple-tree a favourite with man, but also with several species of insects. There is, however, this difference, that whereas with the former it is an article of luxury, with the latter it is a necessary of life—they have it or they die. One of the insects on whose abundance or scarcity we are annually dependent for a large portion of the apple crop is a small beetle of the tribe of weevils (*Anthonomus Pomorum*), which hybernates in crevices, and in the spring is ready for its work. The method of its operations has often been seen and related: I select as the best the account first given by 'Rusticus.'* "By the time the female is ready for the important task of depositing her eggs, the spring has considerably advanced, the apple-buds have burst, and the little bunches of blossom are ready to be distinguished. The weevil soon finds out these; and selecting a blossom every way to her mind, commences her operations. The beak or trunk is furnished at the extremity with short teeth or mandibles: with these she gnaws a very minute hole into the

* 'Observations on Blight,' Ent. Mag., i. p. 35.

calyx of the future blossom, and continues gnawing until the trunk is plunged in up to her eyes; the trunk is then withdrawn, and the hole examined with careful scrutiny by the introduction of one of her feelers, or outer prongs of her trident. If it seems to require any alteration, the trunk goes to work again, and again the feelers: at last, being fully satisfied that the work is well accomplished, she turns about, and, standing with the extremity of her abdomen over the hole, thrusts into it her long ovipositor, an instrument composed of a set of tubes retractile one within the other, and deposits a single egg (never more) in the very centre of the future flower. Another examination with her feelers now takes place; and when she is thoroughly satisfied that all is right, away she flies to perform the same operation again and again, never tiring while she has an egg to lay.

“The bud continues to grow like the other buds; the little perforation becomes invisible. By and by the egg bursts, and out comes a little white maggot, with neither legs nor wings: this maggot, directly it is hatched, begins to devour the young and tender stamens; next to these the style is attacked and eaten down to the fruit, the upper part of which is quickly consumed: the maggot is then full fed; it casts its skin, becomes a chrysalis, and lies perfectly still. Up to this time the blossom has continued healthy, no trace of the enemy being to be discovered from without; but when the neighbouring blossoms are expanding their petals to the genial breath of spring, those of the mutilated bud remain closed, and retain the arched balloon-like appearance of a bud about to burst. For a few days they preserve their lovely pink colour; and then by degrees fade to dingy brown. In this

state they remain until the other apples are well knit; and then the damaged blossoms, by their decided contrast, appear very conspicuous. On opening these brown, or rather rust-coloured, blossoms, between the 10th and 15th of June, the chrysalis will be found to have changed to a perfect beetle, similar to its parent, which, had it been left to itself, would in a few days have eaten its way through the weather-beaten case of dried petals, and left its prison-house, flying about to take its pleasure until the chilly winds of autumn should drive it to its winter habitation under the bark, and in the next spring the whole round of operations through which we have watched its parent and itself would be performed with the same unvarying, unerring instinct. The cloudy, misty east wind, in which our farmers and gardeners see the blight, is the very weather of all least favourable to the propagation and increase of these weevils. The fine, clear sunny days of March and April are the most favourable to them. The tom-tits, sparrows, bulfinches and other birds which at this time of year, more particularly, frequent our orchards and gardens, and which also, at this time of year, are persecuted with relentless hostility by the farmer and gardener, live during these months solely on these weevils and similar little insects, and consequently are the only check on their increase that we possess; so that in our investigations of blight, we see how a little prejudice, superstition and ignorance tend to increase the injury they dread."

An allied beetle, *Anthonomus Pyri*, makes itself at home with the pears in the same way as its relative in the apples. One of our most beautiful beetles, resplendent with purple and gold (*Rhynchites Bacchus*), feeds on apples, but so scarce

is it that an entomologist would willingly sacrifice a good portion of the fruit of a tree if he might but obtain such a prize on it. Possibly it is not so scarce as it seems to be, for orchards are not much frequented by collectors of insects. Several specimens are in old collections, but for very many years it has not occurred, with the exception of a single specimen taken in Birch Wood, Kent, on the 24th of September, 1843, which I saw alive immediately after its capture by Mr. Benjamin Standish. He beat it out of oak under-wood; but it must be remembered that Birch Wood is surrounded by orchards and fruit-gardens. I shall be glad if this notice of our handsomest native insects should fall into the hands of some one who has a ready access to orchards, and will take the trouble to look for so great a desideratum to all our modern collections.

Again I quote from 'Rusticus' his account of the natural history of another lover of apples and preventer of the manufacture of cyder, the negative result of its labours in this respect having more efficacy than the positive endeavours of all the teetotallers together. "The apple moth* is a beautiful little creature, its wings are studded with silvery-shining specks, as though they were inlaid with precious gems. It is the most beautiful of the beautiful tribe to which it belongs, yet from its habits not being known, it is seldom seen in the moth state, and the apple-grower knows no more than the man in the moon to what cause he is indebted for his basketfuls of worm-eaten windfalls in the stillest weather. To find the moth in the day-time the trunks of the apple-trees should

* *Carpocapsa Pomonella*, *Lin.*

be carefully looked over, or, if your orchard be surrounded by a wooden fence, the moth may often be found sitting against it, with its pretty wings neatly folded round its body. Towards evening, in fact at sunset, it begins to move, and may then be seen hovering about the little apples, which, by the time the moth leaves the chrysalis, the middle of June, are well knit, and consequently fit for the reception of the eggs, which it lays in the eyes, one only in each, by introducing its long ovipositor between the leaves of the calyx, which form a tent above it that effectually shields it from the inclemency of the weather or any other casualty. As soon as the egg hatches, the little grub gnaws a hole in the crown of the apple, and soon buries itself in its substance; and it is worthy of remark, that the rind of the apple, as if to afford every facility to the destroyer, is thinner here than at any other part, and consequently more easily pierced.

“The grub, controlled by an unvarying instinct, eats into the apple obliquely downwards, and by thus avoiding the core and pips, in no way hinders its growth: at first it makes but slow progress, being little bigger than a thread, but after a fortnight its size and operations have much increased; it has now eaten half way down the apple, and the position of the hole at the top, if the apple continues upright, or nearly so, is inconvenient for a purpose it has up to this time been used for, that is as a pass to get rid of its little pellets of excrement, which are something like saw-dust or coarse sand; another communication with the outer air is therefore required, and it must be so constructed as to allow the power of gravity to assist in keeping it clear; it is accordingly made directly downwards towards that part of the apple which is

lowest, and thus the trouble of thrusting the pellets upwards through the eye of the apple is saved, and a constant admission given to a supply of air without any labour. The hole now made is not, however, sufficiently open for an observer to gain by its means any knowledge of what is going on within; this is only to be obtained by cutting open a number of the apples as they gradually advance towards ripeness; the hole, however, is very easily seen, from its always having adhering to it on the outside an accumulation of little grains which have been thrust through. Having completed this work the grub returns towards the centre of the apple, where he feeds at his ease. When within a few days of being full-fed, he for the first time enters the core through a round hole gnawed in the hard, horny substance which always separates the pips from the pulp of the fruit, and the destroyer now finds himself in that spacious chamber which codlings in particular always have in their centre. From this time he eats only the pips, never again tasting the more common pulp which hitherto had satisfied his unsophisticated palate; now nothing less than the highly-flavoured, aromatic kernels will suit his tooth, and on these for a few days he feasts in luxury.

“ Somehow or other, the pips of an apple are connected with its growth, as the heart of an animal with its life;—injure the heart, an animal dies: injure the pips, an apple falls. Whether the fall of his house gives the tenant notice to quit I cannot say, but quit he does, and that almost immediately; he leaves the core, crawls along his breathing and clearing-out gallery, the mouth of which, before nearly closed, he now gnaws into a smooth, round hole, which will

permit him free passage without hurting his fat, soft, round body; then out he comes, and for the first time in his life finds himself in the open air. He now wanders about on the ground till he finds the stem of a tree: up this he climbs, and hides himself in some nice little crack in the bark; or frequently he buries himself in the ground. I should remark, that the fall of the apple, the exit of the grub, and his wandering to his place of security, usually take place in the night time. In this situation he remains at rest without stirring for a day or two, as if to rest himself after the uncommon fatigue of a two yards' march; and having made a chamber big enough for his wants, he spins a beautiful little, milk-white, silken case, in which, after a few weeks, he becomes a chrysalis, and in this state remains throughout the winter, and until the following June, unless some unlucky black-headed tit, running up the trunk, peeping into every cranny, and whistling out his merry see-saw, happen to spy him, in which case he is plucked without ceremony from his retreat, and his last moments are spent in the bird's crop; but supposing no such ill fortune to betide him, by the middle of June he is on the wing and hovering round the young apples on a midsummer evening as before.

“By burning weeds in your gardens at this time of year you will effectually drive away this little moth. If you have trees, the crops of which you value, make a smoking (mind, not a blazing) fire under each; it will put you to some inconvenience, if your garden be near your house, but the apples will repay you for that.”

Yet again hear ‘Rusticus’ discourse about another “blight.” “I don’t know why our brethren on the other

side of the Atlantic are charged with sending us the greatest pest of our orchard, but so it is. We call an insect the AMERICAN BLIGHT, which, for aught I could ever make out, may have come from China or Botany Bay. However, a name once in vogue will have its day; and one might as well attempt to turn a pig in an entry as argue against an established belief; so American blight it shall be. In very hot weather you may now and then see this blight on the wing; it has just the look of a bit of cotton, or a downy seed, floating in the air, and is driven by every breath of wind quite as readily. If you catch and examine it, you will find it to be just like the plant-louse which infests our rose-trees, &c.; but, unlike all other plant-lice, it is clothed and muffled up with cotton-wool, in such quantities that you would at first have no more idea that the lump contained an insect, than that the mass of clothes on a stage-coach box in winter contained a man. Some folks wonder what can be the use of so much clothing; I am not much of a theorist, but I should guess that the vermin came from the torrid zone, and Nature kindly furnishes this garment to protect them from the cold of our climate.

“ These blights wander wherever the wind pleases to carry them; and if bad luck should drive one of them against the branch of an apple-tree, there it will stick, creep into a crack in the bark, bring forth its young, and found a colony; the white cotton soon appears in large bunches; branch after branch becomes infected; the tree grows cankered, pines and dies. How this is effected no one knows, though the plague and its doings are too evident to escape the notice of the commonest clown. In large orchards it is in vain to hope for

a cure, but not so in gardens. Directly you see the least morsel of cotton, make up your mind to a little trouble, and you will get rid of it. In the first place get a plasterer's white-washing brush, then get a pot of double size, make your man heat it until it is quite liquid, then go with him into the garden, and see that he paints over every patch of white, though not bigger than a sixpence; the next morning have the size-pot heated again, and have another hunt; and keep on doing so every morning for a fortnight. Your man will tell you it's no use; tell him that's your business, not his; your neighbours will laugh at you for your pains; do it before they are up. I have tried it and known it to be effectual. Spirit of tar has been used with partial effect, so also has resin; whitewashing has been often tried, and as it contains some size, is not entirely useless, and some horticulturists think it ornamental: I do not."

There is a pretty little moth, *Exapate gelatella*, which is more often found about orchards and fruit-gardens than elsewhere, in the months of November and December, though why it should choose such a dreary time of the year to come out, it would be a puzzle to tell. The caterpillar is not very nice in its food, eating indiscriminately of all kinds of fruit-trees, and also whitethorn and elms. What part of the tree it eats is rather a matter of dispute. Madame Lienig records that in Livonia it feeds upon the leaves, which it draws tightly together, and in the habitation so formed it changes to a pupa, securing by one operation both food and shelter; but Mr. May communicated a note on this insect to the Entomological Society in 1849,* in which he says, "The

* Proceedings Ent. Soc., 1849, p. lvi.

larvæ are internal feeders, living principally in the decayed branches of whitethorn, and in a great many instances under the bark of the living stem." I think it probable that, as in the story of the chameleon, both observers may be right, for it may be the normal habit of the larvæ to feed on leaves and then to retire under the bark to make their cocoons, to do which it might become necessary for them, like students at our Inns of Court, to eat their way onwards; and Madame Lienig's caterpillars being in confinement could not follow out their natural proceedings. The sexes of this moth differ greatly in personal appearance; for while the wings of the male expand three-quarters of an inch, those of the female expand only one-third of an inch, and even then are not shaped like her husband's, for, instead of being nicely rounded at the ends with fine long fringes, they go abruptly to a point, looking not unlike those of a newly-hatched duck, and bearing about as much proportion, both in size and appearance, to those of the male as the duckling's do to those of its mother.

A similar disproportion between the wings of male and female may be seen in several other species of our moths—as among the *Tineina*, *Geometrina* and *Bombycina*,—the purpose of which it is difficult to imagine: in some species the disproportion is even greater than in that now under notice, as the female has not the rudiments of wings. In all such cases of imperfect development the female, it is obvious, can make no advances to the male, upon whom, therefore, is thrown all the responsibility of searching for and attending upon his partner; and it must be said to his honour that he does not shirk the duties of life imposed upon him, for he

has as many little pledges of affection born to him as those moths who rejoice in having brides with more pretentious adornment, though not of more attractive power; but, in all cases, his is only a posthumous fame, for he lives not to see his offspring. Another curious circumstance attending the life of these plain, domesticated, short-winged females, is that nearly all the species in which such females occur come to maturity in the cold weather of autumn and spring: the low temperature cannot be the cause of the deprivation of wings, but the inclemency of the time of year should reconcile them to it, since, if they had the *de quoi*, they would not have the inducement to fly. The moths may be found on the trunks of fruit-trees, palings, &c., in the day-time, the females chiefly at night by means of a lantern.

Another and smaller moth, *Coleophora Hemerobiella*, is often abundant about pear-trees, although not often taken, on account of its retiring habits. The larva, like that of the other species of the genus (of which an example is given *ante* page 33), lives in a moveable house, and feeds on the under side of the leaves of the pear-trees. There are several other small moths attached to fruit-trees, which do not require to be noticed here, some being common in every garden, and others seeming equally fond of trees which do not find a place in our orchards or gardens.

In old apple and pear trees may almost always be found the larvæ of the leopard moth (*Zeuzera Æsculi*): they feed on the wood of the trunk, in which they bore galleries, and change to the pupa state just under the bark. The moth appears at the end of July or beginning of August, and may be then found sitting on the tree in which it was reared,

but the female is more often taken than the male. It is a pretty insect; the wings are white, semi-transparent and the upper pair covered with steel-blue spots. The larva lives in other than fruit-trees: in St. James's and Hyde Parks, London, the moths are not unfrequently found on the ground after a high wind, but whoever would get them must go in the morning before the sparrows are up, as these Bashi-Bazouks of the metropolis keep a sharp look-out for them. There is one well-known ash-tree in Hyde Park, on which the moths have been found for several successive years, having probably fed during the larva state in the interior.

In the trunk and branches of the apple lives the larva of *Sesia Myopæformis*, feeding on the alburnum, changing to pupa beneath the bark, and producing the perfect insect in the months of June and July. This insect is truly Lepidopterous, although, like the other species of its genus, it looks at first sight more like one of the Hymenoptera. The insects composing the genera, or more properly subgenera, *Trochilium*, *Sciapteron*, *Sesia* and *Bembecia* are referred by modern authors to the Sphingina, more because they do not know where else to put them than on account of their relation thereto: their connection with the Sphingina seems to me not to be very close, and the structure and habits of the larvæ are very aberrant. They appear rather to form a group *per se*, in which the characters of several other groups are united without approximating very nearly to any one. In the Lepidoptera, and in other Orders, there are several parallel groups of insects which are complete puzzles to systematists: when the natural system

of arrangement is discovered—not invented (I use the word in its conventional sense)—it may be that these inexplicable groups will be found to contain the key of the mystery, or it may be more logical to say that when these groups are understood the system of Nature will be revealed.

The fruit of the plum-tree is the special prey of the caterpillars of a Tortrix (*Opadia funebrana*), and although they devour the best part of a great many plums, the moth they produce is rare in our collections, being seldom met with. The only way to obtain it would be to examine the plums directly they fall in consequence of the attack of the larva within, for, like its congener of the apple before mentioned, it is not long before it quits its fallen habitation. Possibly some good-natured fruit-grower will send to some “fly-catching” friend in town a lot of these “grub-warmint;” he would rather have a dozen of them than a peck of plums.

Under the bark of plum-trees the larva of one of our prettiest moths, *Semasia Wæberiana*, burrows in the alburnum, causing the exudation of gum so often seen on these trees. It also lives in the wood of the cherry, almond, peach and apricot, and, I believe, of the laurel also; at least I have found them in situations where there was no other tree likely to harbour them. The moth is not rare round London on garden fences.

A little moth, *Gelechia alacella*, black with two opposite whitish spots towards the extremity of each wing, inhabits, and probably, in its larva state, feeds on, the lichen which grows on old fruit-trees in orchards. It is exceedingly scarce in collections, and I have never had the good fortune to see

it alive. Two or three other species of the same genus, especially *G. nanella* and *G. albiceps*, are partial to fruit-trees.

The blossoms of the raspberry, in the month of June, are frequented by many moths, among which may be mentioned *Acronycta Ligustri*, *Abrostola Urticæ* and *A. triplasia*. The males of another moth, *Lampronia Rubiella*, beautiful although small, may be seen at dusk flying about the bushes. The females are at this time busy laying their eggs: these soon produce caterpillars, which feed at the base of the young fruit, which, in consequence, never comes to perfection: after doing this mischief, the marauders go to sleep for the winter, and in the spring do still further damage by boring down the young stems, which wither, and thus is caused the loss of all the berries which they would have produced. The natural history of this insect was noticed and recorded by Bjerkander, a Swedish naturalist, in the 'Nova Acta Holmiæ' for 1781, whence his observations have only lately been exhumed. I believe that similar histories, now lost to us, of many other insects, and also descriptions of insects that have in subsequent years been given to the world as new discoveries, lie buried in the volumes of that work, which, being written in the Swedish language, has little chance of being interpreted in this country.

Several species of *Tenthredinidæ*, or saw-flies, insects belonging to the Order Hymenoptera, are nourished by the leaves of fruit-trees. 'Rusticus,' in his own peculiar style, has given the history of one of them, "the gooseberry grub," part of which I extract. "Unconnected with its object, that

of giving birth to one of the greatest nuisances that ever afflicted a fruit-garden, the parent fly is a pleasing and good-looking insect, and is rather a favourite with gardeners, who think it the harmless harbinger of the cloudless skies which accompany its visit. I have often watched these flies glancing in the sunshine, chasing each other over the leaves, spreading out their gauzy and glossy wings, the hind wings projecting from beneath the fore wings, like those of the lappet-moth, and enjoying to the top of their bent the genial influence of that delicious mock summer which we always have before the chill eastern blasts which usher in the real one, and which are supposed to bring the grub into existence.

“ Very shortly after the due celebration of the nuptials, the female repairs to the under side of a leaf, and standing directly over its midrib, her back downwards, her wings closely folded, and her antennæ stretched straight out and continually shivering, she bends her saw under her so as to give her body a curve, and deposits her first egg on the rib itself; then a second, a third, and so on to the tip of the leaf, or as near the tip as she can find convenient standing-room. She then goes to one of the side ribs, then to another, and so on, till all the principal ribs are garrisoned with eggs ranged in the prettiest rows; the eggs are very long, and are placed lengthwise, end to end, like oblong beads on a string, yet not touching, for there is generally a space of about half an egg's length between each two. The eggs are very soft, and of a half-transparent white colour. After the first day the eggs begin to grow, and before the end of a week they have grown to three times

their original size: the head of the egg is always towards the tip of the leaf, and is remarkable for having two black eyes, placed very far apart, and quite on the sides; indeed, so far asunder are these eyes that, like the behind buttons on the coat of a certain illustrious coachman immortalised by Dickens, it is very difficult to bring both into the same field of view.

“ It is seldom more than a week before the grub makes his exit from the egg and his entrance into active life, but the period is not a constant one, varying from four to twelve days. The grub is ready to begin eating directly, so crawling down from the rib he commences operations on the fleshy part of the leaf, in which he gnaws a little round hole. Immediately after making his first meal, the green of the leaf communicates its colour to his body, and he is forthwith a green instead of a smoke-coloured grub, but still so transparent that the particles he has eaten show through his skin as a green line down the middle of his body, and it is this green line which tinges all the other parts. The little grubs descend from the rib in equal numbers, right and left, leaving the skins of the eggs attached to the rib, and looking like a row of empty silver purses. The depredations are now visible above, from the sudden appearance of small round holes ranged in irregular rows: in each of these holes one of the tiny gluttons may be seen clasping the eaten part of the leaf between his legs and elevating the end of his body in the air. At this nick of time, by a little care and industry, you may save your gooseberries. Now that leaf has sixty-seven grubs feeding on it; each grub will eat three leaves before it is full-fed; argal, if you destroy that one leaf and all

its inhabitants, you save two hundred and one leaves. If you have no time to look for these leaves yourself, get some children to do it; they will soon take an interest in the occupation, particularly if backed by a few coppers: surely you would not object to give a child a halfpenny a score for such leaves, and that price would be quite sufficient to clear the vision and sharpen the intellects of many a hungry boy. I would also recommend young ladies to look after such leaves, and pick them into a hand-basket, the contents of which may be emptied into a bucket of water standing near, or disposed of in a variety of ways. If you neglect the trees at this critical time, each infested leaf will be quickly stripped of all its green, the ribs alone remaining; the grubs then descend its footstalk, and wandering about in different directions, each finds a leaf for himself, and the work of devastation begins in earnest.

“ When about half an inch in length, the grub leaves off eating, a very remarkable event, for its appetite is not intermittent, like that of almost all other created beings, but a continued gnawing, craving, never-ceasing, all-consuming propensity. The black head separates from the neck, and splits down the middle, and the skin of the neck also splits, thus altogether making an opening large enough to let the grub poke out his new head, which feat he forthwith performs, and gazes about him, moving his head slowly and majestically from side to side, as though he were just landed in a new world, though a world totally unworthy any expression of wonder or approval: after the head comes the body, which is wriggled through the opening by tedious, laborious and seemingly painful struggles. When the skin is completely

cast, the grub has none of the black spots which before distinguished it; the warts and black hairs are present, but the warts are colorless: the head is clear as glass, and the two black eyes, so conspicuous in the egg and newly-hatched grub, are again visible. In about twenty minutes the black spots begin to appear, and in about four hours become as distinct and the head as black as before the moult. When the grub has regained its colour, it again begins to eat, and eats away night and day without stopping for four or five days more. It then sickens again for the last moult, and this is performed in the same way as the first; but this time the spots, warts and bristles are cast with the skin, and appear no more. The grub is now of a pale delicate green colour, except the yellow patch near each end, which it still retains. It has now done with eating: when hard enough and strong enough after this last moult, it marches to the stem of the bush, and quietly descends till it reaches the earth: sometimes it crawls along a hanging branch and drops from the extremity.

“ The object of gaining the earth is to burrow beneath its surface; and as soon as the grub once feels the soil, he begins forcing his way into it head foremost, after the fashion of a mole. When he is deep enough to answer his purpose, the depth varying, by the way, from two to eight inches, according to the hardness or lightness of the soil, he makes a little oblong cell in the earth, and therein spins or constructs a tough black cocoon, attached all round to the walls of the cell: although I say spins, the material he uses is not silk or thread, but something between silk and glue, or what we might suppose to arise from the hardening of fluid silk, an illustration rather of the uncouthest, but, for want of a

better, it must go. In this cocoon or case he disposes himself to await the change to a chrysalis, and soon after to a fly.

“ The time occupied in this round of existence is very variable ; many of the eggs laid in May, before the middle of the month produce grubs that go through every change, and are on the wing by the 24th of June ; and eggs laid about that day will go through their changes as far as the cocoon by the 10th of July, or 15th at latest ; the first brood thus taking about twenty-eight days, and the second generally remaining under ground till the next spring. It is not, however, clear that in all instances this insect has two broods : on the contrary, I am nearly certain that many of the late hatches never reproduce during the year ; but the time of their first appearance is so variable that a constant succession is kept up, the earliest having reproduced before the later hatches are gone down.”

§ IV.

THE FIELDS.

“Ye field flowers! the gardens eclipse you, 'tis true,
Yet, wildings of Nature, I dote upon you,
For ye waft me to summers of old,
When the earth teem'd around me with fairy delight,
And when daisies and buttercups gladden'd my sight,
Like treasures of silver and gold.”

CAMPBELL.

FIELDS! there is music in the very word. To whom does it not recall flowers and bees, sunshine and butterflies, the shade of trees, the songs of birds, the flitting clouds, the freshening showers, the scent of grass, the murmuring of a brook, and all the thousand sights and sounds that make up the charms of the country? Who does not remember the well-trodden paths, and the little-explored ways, and especially the associations connected with them, not omitting the friends whose company gave the climax to enjoyment? Happy are they who have such reminiscences, happier still should they be who have such pleasures constantly within

their reach ! Yet I venture to say that none but a naturalist can thoroughly appreciate or fully enjoy the country. The scenes that so delight the multitude and enrapture the poets are to them but vague generalities ; "seeing they see not, neither do they understand ;" while, to the naturalist, who knows *something* of the why and because of the various manifestations of life, is superadded a distinct and greater pleasure : from his point of view everything stands out in relief without impairing the general effect, and although the individual forms of the various vegetables and animals he meets have never before gladdened his eyes, yet they stand before him as old familiar faces, or as friends whose acquaintance he will be glad to make. Entomology, on account of the number of beings whose life and ways it presents to notice, has peculiar charms for the Rambler in the fields, and I proceed to point out a few of the more prominent of its productions in this section.

Of our field insects those that attract universal attention are the grasshoppers. All day long, during the hottest weather, when almost every other living thing is glad to be quiet, do these merry little fellows, or rather, I should say, the males only, *fizz* away in a tuft of grass. Poets say they sing ; to my ears the sound is rather too monotonous and wanting in *timbre* to deserve the name of song ; but as the love of Nature in the poets has no doubt made them thus courteous to these insect-performers, I will not argue upon the propriety of the term. Probably also the female portion of the grasshopper community is pleased with the stridulation : another reason why poets and I should not disagree about the matter. That the

gallants among the grasshoppers are at times inspired to please their lady-loves with dancing as well as music seems certain. I have heard a story, told by a celebrated Orthopterist, that one day, when studying the habits of his favourites in the field, he saw a male approach the grassy bower of a female, ascend a stem, as would a Romeo to the lattice of his Juliet, suspend himself by one leg so as to bring himself full into her view, and then, changing sides, swing by the other leg before her: of the first of these advances the lady took no notice, but the second proof of devotion won her heart.

Leigh Hunt has addressed one of his few, delightful sonnets "To the Grasshopper and the Cricket." Would that he had written more on subjects that have a special interest for naturalists!

"Green little vaulter in the sunny grass,
Catching your heart up at the feel of June,
Sole voice that's heard amidst the lazy noon,
When even bees lag at the summoning brass;
And you, warm little housekeeper, who class
With those who think the candles come too soon,
Loving the fire, and with your tricksome tune
Nick the glad silent moments as they pass;

"Oh, sweet and tiny cousins that belong,
One to the fields the other to the hearth,
Both have your sunshine; both, though small, are strong
At your clear hearts; and both seem given to earth
To ring in thoughtful ears this natural song—
In doors and out, summer and winter, Mirth."

Another kindred-souled poet, Keats, has also given us a delightful sonnet on these two insects.

“ The poetry of earth is never dead :

When all the birds are faint with the hot sun,
And hide in cooling trees, a voice will run
From hedge to hedge about the new-mown mead :
That is the grasshopper's—he takes the lead

In summer luxury,—he has never done
With his delights, for when tired out with fun
He rests at ease beneath some pleasant weed.

The poetry of earth is ceasing never :

On a lone winter evening when the frost
Has wrought a silence, from the stove there thrills
The cricket's song, in warmth increasing ever ;
And seems to one in drowsiness half lost,
The grasshopper's among some grassy hills.”

Grasshoppers belong to the Order Orthoptera, and are active and feed through all the stages of their existence. It seems needless to say that they possess great powers of leaping, and that they are very shy : the reason of this latter quality, or want of quality, may be that they are all vegetarians. Like some other singers, they cannot be induced to perform when any one is looking ; directly they become aware of your presence the performance ceases ; but, as if they could not long remain in such an embarrassing situation, and feeling they must sing or die, they try to regain their beloved privacy by going as quickly, and by as few steps as possible, to another tuft of grass, and then they begin again. There are many species in Britain, but I do not think they have been so much looked after as they might be,

and it is possible there are some species not yet noticed. There is one fine large green species (*Gryllus viridissimus*), which is very common in August in the Castle Meadows at Dover, and I have also seen it in other situations in the South of England.

The field cricket (*Acheta campestris*) is very like its in-door relative, but is larger and of a darker colour, and is comparatively rare in England. Gilbert White used to find this insect at Selborne, and thus writes of it in his eighty-eighth letter*—a model, as are all his other writings, for a naturalist's notes of the familiar records of his daily life—"As their cheerful summer cry cannot but draw the attention of a naturalist, I have often gone down to examine the economy of these *Grylli*, and study their mode of life: but they are so shy and cautious that it is no easy matter to get a sight of them; for, feeling a person's footsteps as he advances, they stop short in the midst of their song, and retire backward nimbly into their burrows, where they lurk till all suspicion of danger is over.

"Where violent methods will not avail, more gentle means will often succeed; and so it proved in the present case: for, though a spade be too boisterous and rough an implement, a pliant stalk of grass, gently insinuated into the caverns, will probe their windings to the bottom, and quickly bring out the inhabitant; and thus the humane inquirer may gratify his curiosity without injuring the object of it. It is remarkable that, though these insects are furnished with long legs behind, and brawny thighs for leaping, like grasshoppers, yet,

* 'Natural History of Selborne.'

when driven from their holes, they show no activity, but crawl along in a shiftless manner, so as to be easily taken : and again, though provided with a curious apparatus of wings, yet they never exert them when there seems to be the greatest occasion. The males only make that thrilling noise, perhaps out of rivalry and imitation, as is the case with many animals which exert some sprightly note during their breeding time : it is raised by a brisk friction of one wing against the other. They are solitary beings, living singly male or female, each as it may happen : but there must be a time when the sexes have some intercourse, and then the wings may be useful perhaps during the hours of night. When the males meet they will fight fiercely, as I found by some which I put into the crevices of a dry stone wall, where I should have been glad to have made them settle ; for though they seemed distressed by being taken out of their knowledge, yet the first that got possession of the chinks, would seize upon any that were obtruded upon them, with a vast row of serrated fangs. With their strong jaws, toothed like the shears of a lobster's claws, they perforate and round their curious regular cells, having no fore-claws to dig, like the mole cricket. When taken in hand, I could not but wonder that they never offered to defend themselves, though armed with such formidable weapons. Of such herbs as grow before the mouths of their burrows they eat indiscriminately ; and on a little platform, which they make just by, they drop their dung ; and never in the day-time seem to stir more than two or three inches from home. Sitting in the entrance of their caverns they chirp all night as well as day, from the middle of the month of May to the middle of

July, and in hot weather, when they are most vigorous, they make the hills echo, and in the still hours of darkness may be heard to a considerable distance. In the beginning of the season, their notes are more faint and inward; but become louder as the summer advances, and so die away again by degrees.

“ Sounds do not always give us pleasure according to their sweetness and melody; nor do harsh sounds always displease. We are more apt to be captivated or disgusted with the associations which they promote, than with the notes themselves. Thus the thrilling of the field-cricket, though sharp and stridulous, yet marvellously delights some hearers, filling their minds with a train of summer ideas of everything that is rural, verdurous and joyous:

“ About the 10th of March, the crickets appear at the mouths of their cells, which they then open and bore, and shape very elegantly. All that ever I have seen at that season were in their pupa state, and had only the rudiments of wings lying under a skin, or coat, which must be cast before the insect can arrive at its perfect state: from which I should suppose that the old ones of last year do not always survive the winter. In August their holes begin to be obliterated, and the insects are seen no more till spring.

“ Not many summers ago I endeavoured to transplant a colony to the terrace in my garden, by boring deep holes in the sloping turf. The new inhabitants stayed some time, and fed and sung; but wandered away by degrees, and were heard at a further distance every morning; so that it appears that in this emergency, they made use of their wings in

attempting to return to the spot from which they were taken.

“ One of these crickets, when confined in a paper cage and set in the sun, and supplied with plants moistened with water, will feed and thrive, and become so merry and loud as to become irksome in the same room where a person is sitting: if the plants are not wetted it will die.”

There is another insect of this family, the mole-cricket (*Gryllotalpa vulgaris*), which is interesting on account of its peculiar habits and corresponding structure. Thus Gilbert White writes about it: “ How diversified are the modes of life, not only of incongruous, but even of congenerous animals! and yet their specific distinctions are not more various than their propensities. Thus, while the field-cricket delights in sunny, dry banks, and the house-cricket rejoices amidst the glowing heat of the kitchen-hearth or oven, the mole-cricket haunts moist meadows, and frequents the sides of ponds and banks of streams, performing all its functions in a swampy, wet soil. With a pair of fore-feet, curiously adapted to the purpose, it burrows and works under ground like a mole, raising a ridge as it proceeds, but seldom throwing up hillocks.

“ As mole-crickets often infest gardens by the sides of canals, they are unwelcome guests to the gardener, raising up ridges in their subterraneous progress, and rendering the walks unsightly. If they take to the kitchen quarters, they occasion great damage among the plants and roots, by destroying whole beds of cabbages, young legumes and flowers. When dug out, they seem very slow and helpless, and make no use of their wings by day; but at night they

come abroad, and make long excursions, as I have been convinced by finding stragglers, in a morning, in improbable places. In fine weather, about the middle of April, and just at the close of the day, they begin to solace themselves with a low, dull, jarring note, continued for a long time without interruption, and not unlike the chattering of the fern-owl or goat-sucker, but more inward.

“About the beginning of May they lay their eggs, as I was once an eye-witness; for a gardener at a house where I was on a visit, happening to be mowing on the 6th of that month, by the side of a canal, his scythe struck too deep, pared off a large piece of turf, and laid open to view a curious scene of domestic economy. There were many caverns and winding passages leading to a kind of chamber, neatly smoothed and rounded, and about the size of a moderate snuff-box. Within this secret nursery were deposited nearly an hundred eggs, of a dirty yellow colour, and enveloped in a tough skin: but too lately excluded to contain any rudiments of young, being full of a viscous substance. The eggs lay but shallow, and within the influence of the sun, just under a little heap of fresh-moved mould, like that which is raised by ants.

“When mole-crickets fly, they move *cursu undoso*, rising and falling in curves. In different parts of this kingdom people call them fen-crickets, churr-worms and eve-churrs, all very apposite names.

“Anatomists who have examined the intestines of these insects astonish me with their accounts; for they say, that from the structure, position and number of their stomachs or maws, there seems to be good reason to suppose that this and

•

the two former species (field and house-crickets) ruminate or chew the cud like many quadrupeds !”

Authors do not agree as to the food of the mole-cricket, but the balance of evidence goes to prove that it is by choice of a carnivorous habit. I once had two forwarded from the Duke of Devonshire’s garden at Chiswick, placed together in a box, where they had a duel, after the Yankee fashion of fighting in a dark room, and with the most murderous result,—of one there were only fragments left, and the other was reduced to the condition of the old sailor, of whom it is said or sung, that

“ When they shot away his legs
He fought upon his stumps.”

It is said that three years elapse between the hatching of the egg and the perfection of the insect, but this is a point open to investigation. And although White has not only said that this insect flies, but describes its flight as undulating (“*cursu undoso*”), yet Zetterstedt and other authors deny that it uses its wings for flight; so that some new observations on this matter are desirable.

Butterflies are especially fond of fields; even species more attached to woods often come and fly over fields, as if in mere wantonness. In a field at the side of one of the young plantations in the New Forest, I have in the month of June, in different years, found the black-veined white (*Pieris Cratægi*) very abundant; and very much was I delighted to watch these butterflies, which are not found near London, chasing each other over the waving grass: I fear I did the

latter no good by running through it in my eagerness to catch the former.

All the blue butterflies (*Polyommata*) are preeminently field-lovers, and splendid illuminations are they of the beauteous floral pages of Nature. Their near relative, *Chrysophanus phlæas*, is also no mean addition to the ornaments of the fields, being, although one of the commonest, yet also one of the most brilliant of our butterflies. The larvæ of these butterflies are very curious, onisciform or wood-louse shaped creatures, but, from their habit of feeding on pasture-plants close to the ground, are seldom found; indeed, the larvæ of some of the species are yet unknown.

Though winter affords the entomologist plenty of occupation in the fields, as we shall presently see, yet no one looks forward to the spring with more eagerness and anticipation.

“When daisies pied and violets blue,
And lady-smocks all silver white,
And cuckoo-buds of golden hue,
Do paint the meadows with delight,”

then he is haunted with the fond remembrances of past pleasures, which, although forming a vast aggregate in his mind, come to him one by one, as inestimable rewards of his patience and assiduity. And as the season advances so many employments and novelties crowd upon him that he lives in an ecstasy far above “the dreary intercourse of common life;” existence has new charms, and he feels that to be is to be happy. For him are combined ‘Pleasures of Memory’ and ‘Pleasures of Hope’ that the authors

of the celebrated poems with these titles never once dreamed of.

When the fields are in the full flush of summer beauty, the approach of evening adds a charm to the scene to which few are insensible. Then the rovers in sunshine have gone to repose, and the lovers of twilight and darkness take their places. Then the whole tribe of moths become active, creeping from the retreats among the grass and bushes in which by day they had concealed themselves, and at first flying madly about; then through the fading light may be seen,—

“The plumed insects swift and free,
Like golden boats on a sunny sea,
Laden with light and odour, which pass
Over the gleam of the living grass.”

After awhile their impetuosity is calmed, and they hover more complacently, but still in excitement, round the flowers which afford them food, until they settle to rifle them of their sweets. It is then that the collector has a chance of getting some beauties, to whose charms he would otherwise remain a stranger; also of seeing how particular species are attached to particular flowers, and of observing peculiarities of habit. Some species come before the sun is well down; some when it is dusk; others not until it is quite dark. Some again scarcely touch the flowers, but sustain themselves on the wing while they insert their long proboscis; some settle timidly, and are off at the slightest alarm; and others sit down boldly, like *bon vivants*, determined to enjoy themselves.

Some are to be found all night long, while others come and go early, returning again before dawn; but daylight finds the scene free from the festive revellers; and the flowers that looked so modest under the lamp then hold up their lips to be kissed by the rovers that bask in the sunshine—quite the reverse of the practice among human creatures. What a theme for a poet! Who is not touched by such a picture?

I may mention as field-plants whose flowers are particularly attractive to nocturnal moths, the different species of catchfly (*Silene*) which grow at the margins of corn-fields on chalky soils, Clematis, honeysuckle, lime-trees, holly and brambles.

The place where any attractive plant grows in plenty is more likely to be frequented by moths in abundance than a spot where only one or two such plants are, although a solitary plant will sometimes give a rarity. Sheltered spots are the most productive, especially if an easterly wind be blowing, its cold blasts being as much disliked by moths as men: indeed, it will often happen that with such a wind not one moth will be seen, although the previous evening, with a south-wester, there were hundreds flying about.

In the 'Zoologist' for 1843, page 64, I published the following account of what then seemed to me an inexplicable occurrence, though from subsequent experience I am induced to think that the sweet secretion of Aphides, which has been found to be very attractive to moths, was the cause of the phenomenon:—"On the evening of the 20th of August last, Mr. Bedell and myself were returning from mothing in the fields between the Kent Road and the Greenwich Railway,

having had but very little success, when a moth was seen to rise from the grass, and, being caught, it proved to be *Graphiphora punicea* (now *bella*). We next began to sweep the grass, and were surprised to find moths, not singly or in dozens, but in hundreds. The next night saw us there with lanterns and other necessary apparatus; and if we were surprised the previous night, we were then much more so. Almost every blade of grass had its insect; in fact, I do not believe that so many moths were ever before seen together. The majority were females, and Mr. Bedell found some eggs, which had apparently been recently deposited on the grass. Several subsequent visits were paid to the spot, and always with the same results; the quantity of moths visible, however, varying greatly on different nights, cold and windy weather having the usual effect in diminishing the number. The species taken were *Graphiphora plecta*, *G. punicea* (*bella*), *G. C-nigrum*, *Lytæa umbrosa*, *Segetia xanthographa*, *Gortyna micacea*, *Apamea fibrosa*, *Leucania pallens*, *Orthosia lunosa*, *Lozotania spectrana* and *Nomophila hybridalis*."

Not far from the place above mentioned, the same friend and I once found, in July, *Ochsenheimeria Birdella* flying in profusion close to the surface of the ground. This was in the forenoon: on going to the place a day or two afterwards, in the evening, not a moth was to be seen, and subsequent observation has confirmed the truth of our suspicion that these insects do not fly after the middle of the day. They are not rare in moist meadows in several localities. In the 'Zoologist' for 1854, page 4336, Mr. John Scott published the following account of the early life of this species:—

“About the beginning of May, the *Holci*, or soft grasses, have attained a length of some few inches, and in the stems of these feed the larvæ of *Ochsenheimeria Birdella*. Care must be taken in extracting them from the ground. The grass should be seized as low down as possible, else the caterpillar is very liable to be crushed. The mode of ascertaining whether or not anything be in the grass is by noticing if the centre leaf be discoloured, *not mined*. Of course, if the larva has just taken possession of its new home, the discoloration may not be discernible, and it is therefore necessary to examine all the plants. If, on opening any of them, there should be a pale buff larva, slightly attenuated at each end, and with a minute spot on the anterior edge of each segment just above the spiracles, you have the object of your search. It grows to about half an inch in length, and changes about the middle of May; the perfect insect coming forth in the beginning of July. The chrysalis is pale brown, enclosed in a snow-white cocoon.”

After the month of June it is impossible to walk among grass without disturbing quantities of small moths, most of which are *Crambi*, long narrow-winged fellows which settle on the grasses with their heads downward; where they come from nobody knows: their larvæ are supposed to feed on roots of grasses. There is also a little creature of a moth, *Gelechia terrella*, which at sunset flies over the surface of grass lands in thousands, settling and rising again immediately. Although so common an insect, nothing whatever is known of its early history. Fischer von Röslerstamm, it is true, has figured a larva as that of this moth, but, it appears, in error, for we have found this kind of larva to

produce a very different species, *Gelechia rufescens*. If the larva of *G. terrella* be like Fischer's figure, it will be very singular that two very distinct moths should be so much alike in their infancy: every naturalist would be puzzled to say "who's who." We hope the mystery may soon be elucidated.

The old English collectors of Lepidoptera used to obtain fine specimens of many rare species by digging up the pupæ from the ground at the roots of trees; but since the method of attracting moths by means of sugar came into use, the more uncertain and laborious digging for pupæ has been followed by few persons. Yet it is a plan not to be despised or given up, for many fine species that will not come to sugar, and of which the larvæ are seldom taken, are only thus to be obtained. The winter is the best time for digging, but many species are only to be got in the summer. The Rev. Joseph Greene has been the most assiduous reviver of the digging system, and in April, 1853, communicated a paper thereon to the Entomological Society,* from which I make the following extract:—

"The only instrument I use is a common garden trowel. The form is immaterial: perhaps a rounded blade is best, as passing with greater ease between the roots.

"The trees which I have found the most productive are the following:—elm, oak, ash, poplar, beech and willow. I never found anything at birch, maple or chestnut. Perhaps a short list of a few of the pupæ obtained at those trees may prove interesting.

* Proceedings Ent. Soc., 1853, p. 109.

“ Elm.—*Smerinthus Tiliæ*, *Petasia cassinea*, *Tæniocampa rubricosa*, *T. populeti*, *T. munda*, *Cosmia diffinis*, *Xylina semibrunnea*, *Anisopteryx æscularia*, *Hybernia leucophearia*, *H. aurantiaria*, &c.

“ Oak.—Considering the number of larvæ that feed upon oak, I have been surprised at finding so few pupæ at it. This, I suppose, is partly owing to the fact that a considerable number of the insects whose larvæ feed upon oak do not pass the winter in the pupa state. However, when you do succeed in getting one, it is generally good; and I have found *Notodonta trepida*, *N. Chaonia*, *N. Dodonæa*, *Geometra papilionaria*, *Biston prodromaria*, &c. I was much surprised to find, on two occasions, the empty cocoon of *Cerura vinula* on the trunk of an oak.

“ Ash.—*Pæcilocampa Populi*, *Acronycta Ligustri*, *Geometra lunaria*, *G. illustraria*, &c., &c.

“ Beech.—This and the poplar are the best trees. At the former I have found *Lithosia rubricollis*, *L. aureola*, *Orgyia Coryli*, *Notodonta camelina*, *Tephrosia consonaria*, &c.; at the latter, *Phragmatobia mendica*, *Pæcilocampa Populi*, *Cerura bifida*, *C. furcula*, *Ptilodontis palpina*, *Notodonta Dictæa*, *N. Dictæoides*, *Clostera curtula*, *Ceropacha Or*, *C. ocularis*, *Ypsipetes ruberaria*, &c.

“ Meadows and parks with scattered timber-trees are decidedly the best localities: being near a wood seems no advantage. It is, however, a very curious fact, that the nearer these meadows or parks are to inhabited places, as towns, villages, or even a single farm-house, the more abundant are the pupæ. I have observed this repeatedly, and in the most marked manner. I may mention two

examples: nine specimens of *Notodonta Dodonæa* were all obtained at the roots of an oak about a dozen yards from a farm-house; and, though I searched upwards of forty trees in the neighbouring fields, I could not find a pupa of any kind whatever. At the same tree I found *Biston prodromaria* and *Tæniocampa gothica*. Again, the winter before last (1851-52), being in Dublin, I went to the Phoenix Park to dig. So long as I continued near the city I found the commoner sorts of pupæ in plenty, but the further I retired from it the scarcer they became; until, at about three miles distance, I could not find one. I should be very glad to see some explanation of this curious circumstance. Perhaps it may be partly accounted for on the supposition that the parent moth is attracted by the lights in houses, and lays her eggs on the neighbouring trees."

Mr. Greene goes on to notice woods and hedge rows as places for digging; his remarks thereon I will give under the respective heads. He then continues:—"The next point which may be considered worthy of notice, is the mode of search. This, of course, varies according to locality. In digging, it must be borne in mind that all pupæ are close to the trunk of the tree, seldom more than two inches distant. Frequently the trunk of the tree forms one side of the cocoon, especially the cocoon of such insects as spin. Again, pupæ lie close to the surface of the earth (I have seen those of *Smerinthus Populi* and *S. Tiliæ* half out of the earth); the larva of *Calocampa exoleta* is the only one I know of that goes to a considerable depth. Insert then the trowel about three inches from the trunk, to the depth of two inches or so; then push it to the tree and turn it up. If the soil

be dry and friable, without grass, knock it gently with the trowel, which will be sufficient. If, however, there be grass, you must proceed more cautiously: take up the sod in the left hand, knock it very gently with the trowel, and those pupæ which merely enter the ground will drop out. To find those which spin, you must carefully examine the sod, tearing the roots of the grass asunder. These are, of course, much the most difficult to find, the cocoons being generally of the colour of the earth. I may here remark that it is useless to try sticky or clayey ground, the caterpillars being unable to penetrate it. In searching under moss, the best plan is to loosen the edge, then to tear it gently off, observing whether any pupæ fall. Look at the trunk to see if anything adheres to it, and then carefully examine the moss itself. Experience alone will enable you to detect a spun cocoon.

“ Searching under loose bark requires no comment: one observation, however, on the *Ceruræ*. I have heard it mentioned that the pupæ of the *kittens* are to be found near the roots: my experience goes to prove quite the reverse. Every one who has looked for them knows the extreme difficulty of detecting them. I found fifteen last autumn, and they were all, without exception, at least two feet from the ground. The puss moth certainly forms its cocoon near the ground generally, but not the kittens, I think.

“ If I were asked which are the most likely trees, I should say those whose branches spread out towards the ground, since moths seldom fly to the top branches; those whose roots form an angle filled with loose dry earth, especially when covered with grass; and, lastly, those which have a

thick moss upon them. Nothing, however, can be more uncertain than any rules in this matter. You will perhaps see ten elm trees, to your eye exactly alike: at nine you may find nothing; at the tenth, possibly twenty or thirty pupæ. I remember, on one occasion, trying a number of ash trees without the slightest success, and was about to give up the search as hopeless, when I resolved to try one more. At that one I found forty-six pupæ of *Ennomos illunaria* and three of *Pacilocampa Populi*!

“No pupa-hunter can hope for success, unless he have a good stock of patience and perseverance. He must not mind cold hands, wet feet, or an aching back; for although all these are drawbacks, yet is the pursuit (to me) quite exciting, when successful, and it will reward the seeker, not merely of Lepidoptera, but also of all other orders of insects.”

Haystacks are the favourite resort of many small moths, especially *Depressariæ*: they take shelter among the thatch, and may easily be beaten thence into the net. The thatch of cattle-sheds is also resorted to by these and other moths, and when the thatch is old and covered with moss it is frequented by *Crambus falsellus* and *Gelechia basaltinella*, the larvæ of which feed on the roots of the moss. The base of hay-ricks is the favourite sheltering place of hosts of small beetles, especially the *Brachelytra*, including many species of those remarkably formed creatures, the *Pselaphidæ*.

In grass-meadows humble bees build their nests on the ground or in it. The latest summary of the natural history of these social Hymenoptera is that by Mr. Frederick Smith, in his recently published book on bees,—no mere catalogue,

as the title would imply,* but full of readable matter, and a work which for lucidity of arrangement, conscientiousness of description, soundness of generalization, clearness of detail and felicity of style, has no equal among Natural History books. In his general remarks on the genus *Bombus*, Mr. Smith says:—"The *Bombi* are the most generally known of all the genera of wild bees, hence they have received a variety of popular names: in Hampshire they are called 'Dumbledors,' in other districts 'Bumble-bees' and 'Hummel-bees;' the brown species are known in Scotland as 'the Foggie-bee,' no idea existing of there being more than one species of that colour."

The hard pathways in fields are selected by some species of bees, of the genus *Andrena*, for instance, in which to form their burrows, though why they should do so when they might make them with much less labour elsewhere is a mystery. Mr. Smith tells us that one species, *Andrena cineraria*, is very abundant in the walks in Hyde Park,—a rare instance of an insect maintaining its hum where that of man prevails in a locality once the bees' own, but into which the former animal has intruded.

In the hard field paths I have often seen nests of ants, and have watched with much interest the bustle that occurs when the gravid females come out and take flight to found new colonies; or rather such is their intention, but swallows and other birds devour thousands of them, and so it happens that but comparatively few escape and fulfil the object of their lives. The economy of ants is very wonderful, and has

* 'Catalogue of the Bees of Great Britain:' Part I., Apidæ—Bees. London: 1855.

been graphically described by Huber* and others. Their ways and means of existence afford a most attractive study, and as there are several native species, inhabiting different kinds of localities, one or other of them is within reach of every one.

The sides of fields are grand places for the entomologist, for to the flowers of the wild plants which grow there hosts of insects of all orders resort from their various birth-places in field, bank, hedge and wood. One sweep of the net will give the collector more insects than he can secure; but before he strikes let him con warily the flowers before him; he may then often see a rarity of which he can make sure, which he might overlook among the multitude in his net after he had struck, or lose altogether by its falling outside it.

Who that ever walked through the meadows on a summer's evening has not seen and admired the glow-worm?

Shakspeare has not omitted to allude to it: the Ghost in Hamlet says—

“The glow-worm shews the matin to be near,
And 'gins to pale *his* ineffectual fire.”

In his poem ‘Italy,’ Rogers thus concludes the verses on the fire-flies of the Tusculan groves:

“Yet cannot I forget
Him who rejoiced me in those walks at eve,†
My earliest, pleasantest; who dwells unseen,
And in our northern clime, when all is still,

* ‘Recherches sur les Mœurs des Fourmis Indigènes.’

† The glow-worm.

Nightly keeps watch, nightly in bush or brake
His lonely lamp rekindling. Unlike theirs,
His, if less dazzling, through the darkness knows
 No intermission; sending forth its ray
 Through the green leaves, a ray serene and clear
 As Virtue's own."

The female only emits the phosphorescent light,* a fact Shakspeare and Rogers evidently did not know, or they would not have used the masculine pronoun; and if they had been aware of the sex of the luminous creature, they would scarcely have missed the idea, and a true one, too, which Montgomery has since used, that the female glow-worm lights her lamp

" To captivate her favourite fly,
 And tempt the rover through the dark."

And yet the producer of this ethereal radiance is a most ordinary looking brown insect, destitute of wings and with little power or inclination to use its legs; the male is winged, and flies at night, not unfrequently to lights in houses. It would be delightful to think of such creatures as fed and nourished on tender plants and the honey of flowers; but the truth must be told: and they are voracious eaters of flesh—the flesh of snails! The subject has been studied; they have been taken in the act. It is too horrible to think of all the details of their history: let us draw a veil over the scene; and, as with some examples of human genius, be content

* The male, I know, has been observed to be luminous at times, but the light is faint, and this sex is not the glow-worm of the country or the poets.

with the ultimate lustre, without inquiring into the minutiae of its origin and support.

Under clods and stones in fields during the day-time rest many species of ground-beetles (*Geodephaga*), which are all carnivorous, and roam about during the night in quest of worms and caterpillars, or indeed of any other unlucky insect they can find: most relentless is their nature, and no quarter do they give their victims, as you may prove by putting two, even of the same species, in a box together. But their nature makes them among the best friends the agriculturist has, although he knows it not. It is true that one species (*Zabrus piger*), found in corn-fields, often in considerable numbers, is accused of eating the corn in the ear, and there is much evidence to show that it is guilty; but a granivorous habit is so contrary to that of the whole of the family of beetles to which it belongs, that I am inclined to think that the destruction of the corn is caused, not for the sake of the corn itself, but in order that the beetles may obtain the larvæ of the various corn-eating insects enclosed within and between the grains.

One of our commonest beetles, the cockchaffer (*Melolontha vulgaris*) is nourished in the larva state by the roots of grasses (including corn) and other field-plants, and also of young trees. It is said to exist four whole years in the larva state, and, as it feeds during the most of that time, the quantity of matter it consumes must be enormous; the larvæ exist at times in prodigious numbers, and the damage they cause is immense, whole fields being ravaged by them. In their perfect state they do not live long, but when they appear in great plenty the leaves of various trees disappear as if by magic. Fortu-

nately it is only occasionally that this beetle exists in such numbers as to be a pest, and it has been noticed that the year next following that in which they are very common the country is almost free from them.

Rooks, starlings and other birds are very fond of the larvæ of these and other hurtful insects, but man in his perversity never misses an opportunity of destroying these friends, blindly thinking all the while that he is doing the State some service.

There are some other very common insects to be found in corn-fields, which I need not stop to enumerate; with these exceptions corn-fields are not good localities for collectors of insects: and in proportion as waste and forest lands come under cultivation, so does the number of species of our native insects decrease. I may, however, advert to *Asychna æratella*, a little moth, one of our rarest, of which I took half a dozen by sweeping at the side of a corn-field near Darenth Wood, last July. Among the information picked up by Mr. Stainton last summer, during his tour in Germany, was the fact that the larva of this moth feeds inside a gall-like formation on the stems of *Polygonum aviculare*, one of the commonest weeds, which is very fond of growing on and about hard field-paths. The following extract from the notes of Herr Grabow, of Berlin, is given by Mr. Stainton: *—“ ‘26th September, 1852:—Herr Kalisch discovered a pod-like excrescence on *Polygonum aviculare*. Such a growth not being usual in that plant, he cut it open, and found a larva enclosed in a cocoon. On the outside of this excrescence there was not the slightest trace

* ‘The Entomologist’s Annual’ for 1856, p. 57.

of any injury from the larva, and we must therefore conclude that when the larva escapes from the egg it bores into a bud, and so causes this growth, which then grows around the larva and encloses it, the larva feeding upon its fleshy interior. Before the larva changes to a pupa (which happens in the month of May) it eats a small opening towards the end of its habitation, and through this some *frass* makes its appearance,—this is a certain sign that the larva is about to change to a pupa.’ This discovery of Herr Grabow’s, of a gall-producing Lepidopterous larva, is of extreme interest.”

Wherever there is decaying vegetable matter, there insects are sure to be found: numberless species are wholly supported by it. In like manner the ordure of animals feeds hosts of insects, especially Diptera and Coleoptera; and while it serves as a stimulant to vegetables, it is a necessary of life to many insects specially adapted to live in it and upon it. It might have been supposed that creatures living in the midst of filth would have been hideous by reason of their defilement; but it is not so. How clean and polished is a dung-beetle, scrupulously neat even in the minutest portion of its frame, looking in its full dress of black more like a drawing-room guest than the scavenger that he is, spending his life in dirt, except such portion of it as is occupied in flying about in quest of employment. It is in this stage of its existence that he is known as

“The shard-borne beetle with his drowsy hum,”

often making the acquaintance of the twilight wanderers in the fields by flying in their faces, to their consternation and

the risk of his own life. Like other explorers he sometimes falls a victim to his carelessness, and his mutilated remains on many a path tell the tale of his untimely fate. His race are benefactors, and they work hard to accomplish the purpose of their existence. With infinite labour, for which, however, their strong frame is well adapted, they dig deep holes in the ground, throwing out the earth behind them till it forms a little hillock, then a portion of dung is conveyed in the form of a ball to the bottom to serve as the food of the grub which will be hatched from the egg laid within it; in due time this comes forth a perfect beetle, and the same series of operations goes on for ever.

Just think of the numberless animals that, by fair means or foul, die daily. Parental affection watched over their birth, attended to their early wants and soothed their infant cries; they grew up strong and healthy, set up in the world for themselves, and fulfilled the purposes of their creation,—the last and not least of which was to die. Then not only do none pity, mourn for or bury them, but their exit is the signal for rejoicing among the whole tribe of carrion-beetles. They lift up their noses and smell their dinner afar off. Almost as soon as an animal is dead do these vultures of the insect world begin to assemble, no matter what is the size of their prey, whether it be a sparrow or a sheep. Sterne might have gone a little further with his sentiment about the dead ass,—might have touched up his story a little more,—if he had turned over his subject as well as looked at it. Dead donkeys and Sternes to moralize on them are rare—Sam Weller vouches for the former, every one knows the latter. But a friend of mine once found the body of a donkey that

had departed this life, smelling like anything but a gale from Araby the Blest: he sternly, but unsentimentally, resolved to do his apparent duty, turned it over, and was duly rewarded with lots of carrion-beetles and a typhus fever.

Rusticus shall contribute his account of the doings of the "burying-beetle,"* or rather of one of the species of burying-beetles (*Necrophori*). "The burying-beetle is about an inch in length; he is black, with two bands across his back of a bright orange colour; these bands are formed by two blotches of that colour on each of the wing-cases: he is a disgusting creature, though in such a gay dress, being so fœtid that one's hands smell for hours after handling him, and if he crawls on one's coat, or other garments not often washed, the smell continues for days. The whole tribe of burying-beetles lay their eggs in the bodies of dead animals, which, when possible, they bury for the purpose: he sometimes avails himself of dead dogs and horses, but these are too great rarities to be his constant resort: the usual objects of his search are dead mice, rats, birds, frogs and moles; of these a bird is most commonly obtained.

"The burying-beetles hunt in couples, male and female; and when six or eight are found in a large animal they are almost sure to be males and females in equal numbers: they hunt by scent only, the chase being mostly performed when no other sense would be available,—*viz.*, in the night. When they have found a bird, great comfort is expressed by the male, who wheels round and round above it, like an eagle,—the female settles on it at once, without this testimonial of

* 'Letters of Rusticus,' p. 126.

satisfaction ; the male at last settles also, and the bird undergoes the scrutiny of four at least of the senses,—touch, smell, sight and taste,—for their heads are continually diving among the feathers of the bird, and a savory and ample meal is made before the great work is begun. After the beetles have appeased the calls of hunger, the bird is abandoned for a while ; they both leave it to explore the earth in the neighbourhood, and ascertain whether the place is suitable for interment ; if on a ploughed field, there is no difficulty ; but if on grass or among stones, much labour is required to draw the body to a more suitable place. The operation of burying is performed almost entirely by the male beetle, the female mostly hiding herself in the body of the bird about to be buried, or sitting quietly upon it, and allowing herself to be buried with it : the male begins by digging a furrow all round the bird, at the distance of about half an inch, turning the earth outside ; his head is the only tool used in this operation ; it is held sloping outwards, and is exceedingly powerful. After the first furrow is completed, another is made within it, and the earth is thrown into the first furrow ; then a third furrow is made, which, being under the bird, the beetle is out of sight : now the operation can only be traced by the heaving of the earth, which soon forms a little rampart round the bird ; as the earth is moved from beneath, and the surrounding rampart increases in height, the bird sinks. After incessant labour for about three hours, the beetle emerges, crawls upon the bird, and takes a survey of his work. If the female is on the bird she is driven away by the male, who does not choose to be intruded on during the important business. The male beetle then remains for about an hour perfectly still, does not

stir hand or foot; he then dismounts, diving again into the grave, and pulls the bird down by the feathers for half an hour; its own weight appears to sink it very little. The earth then begins heaving and rising all round, as though under the influence of a little earthquake: the feathers of the bird are again pulled, and again the bird descends. At last, after two or three hours more labour, the beetle comes up, again gets on the bird, and again takes a survey, and then drops down as though dead, or fallen suddenly fast asleep. When sufficiently rested, he rouses himself, treads the bird firmly into its grave, pulls it by the feathers this way and that way, and, having settled it to his mind, begins to shovel in the earth: this is done in a very short time by means of his broad head. He goes behind the rampart of earth, and pushes it into the grave with amazing strength and dexterity; the head being bent directly downward at first, and then the nose elevated with a kind of jerk, which sends the earth forward. After the grave is thus filled up, the earth is trodden in, and undergoes another keen scrutiny all round, the bird being completely hidden; the beetle then makes a hole in the still loose earth, and having buried the bird and his own bride, next buries himself. The female lays her eggs in the carcass of the bird, in number proportioned to its size; and after this operation is over, and the pair have eaten as much of the savoury viand as they please, they make their way out, and fly away in quest of further adventures. The eggs are hatched in two days, and produce flat, scaly grubs, which run about with great activity: these grubs grow excessively fast, and very soon consume all that their parents had left. As soon as they are full grown, they

cease eating, and burrowing further in the earth become pupæ. The length of time they remain in this state appears uncertain; but when arrived at the perfect state, they make round holes in the ground, from which they come forth."

Other beetles, some of them allied to the *Necrophori*, such as the species of *Silpha*, are attracted to and feed upon the dead bodies of animals, and between them and the larvæ of Diptera, which abound in such bodies, there is soon little flesh left on the bones. Then other families of beetles, *Dermestidæ* and *Nitidulidæ*, have their turn, the former appropriating the skin, the latter the cartilage and muscle that yet remain. And thus, with animal as with vegetable bodies, nothing is lost, each atom becomes the means of supporting some form of animal life, or is resolved into its primitive elements, in all cases again to be compounded with other atoms into new forms, and so on for ever.

§ V.

THE HEDGES AND LANES.

“ The grass, the thicket, and the fruit-tree wild,
White hawthorn, and the pastoral eglantine,
Fast fading violets cover'd up in leaves ;
And Mid-May's eldest child,
The coming musk-rose, full of dewy wine,
The murmurous haunt of flies on summer eves.”

KEATS.

“ The green lane rough with fern and flowers.”

ROGERS.

THE hedges between and bounding fields in the South of England give a very peculiar character to the scenery, not observed by the natives, but remarkable in the eyes of those who have been accustomed to the stone walls or entirely open fields of the North. Viewed agriculturally hedges are little better than nuisances, for they serve as great sheltering places for birds and other agents destructive to field crops ; but, on account of the harbour they give to insects, both for food and shelter, they are great favourites with entomologists, and many a sigh has escaped the insect-hunter when, on

revisiting the spot where the year before he captured a single specimen of some rarity, he finds that the hedge out of which he beat it is levelled with the earth, and that if it be not exterminated it will be years before there is a hedge to be of any entomological use; the chances being that never again will an improved system of agriculture allow such a hedge as has vanished to grow up. Such a hedge as I mean is to be seen all over the metropolitan counties, not a mere film of whitethorn that a butterfly could go through at a bound, but a little plantation twenty or thirty feet thick. Just fancy what hosts of insects of all kinds nestle in such a cover: you may beat it again and again without getting your game to leave it. I hardly know where to begin to enumerate the multitudinous inhabitants.

Field-hedges are in general supposed to be formed of whitethorn, and so they are while well kept. One of my earliest entomological recollections is connected with a hedge of this kind: I found a bluish-green caterpillar, about an inch and a quarter long, with a large head and longish legs; it curled itself up, and being the first of the kind I had seen it took my attention exceedingly, and I watched it constantly. But I had not long time allowed me to look at it: it was full fed, and soon spun a stout oval cocoon in which to change to a pupa, and thus its further proceedings were hidden from view. It lay still all through the winter and until May of the next year, when behold, instead of a moth, as I expected, came forth a four-winged fly (*Trichiosoma lucorum*) belonging to the Hymenoptera. Young collectors are often deceived by these larvæ of saw-flies, thinking they are Lepidopterous, but from these they may be distinguished by

greater size of the head and greater length of legs, and their habit of curling themselves up.

Scarcely are the whitethorn hedges well clothed with leaves ere they are covered with the white filmy webs of the caterpillars of one of the ermine moths, *Hyponomeuta padellus*, and in some years these caterpillars are so abundant that the hedges are stripped of every leaf, and become as brown and bare as in winter. Another hedge-plant, the spindle-tree (*Euonymus Europæus*), is devastated by the larvæ of three other species of *Hyponomeuta*, viz., *plumbellus*, *Evonymellus* and *irrorellus*, the first two being common, the third rare. Another species, *H. Padi*, feeds in the bird-cherry (*Prunus Padus*), which is frequently found in hedges. The larva of a much larger white moth, the gold-tail (*Porthesia auriflua*), is generally very common on whitethorn hedges; and sometimes appears in great numbers, not only on the hedges, but on rose-trees, brambles and fruit-trees. Another moth is nourished by the whitethorn, and is common everywhere—I allude to the brimstone moth (*Rumia Cratægata*), so called from the colour of its wings: a stroke on a hedge at any time during the summer will be almost sure to dislodge one or more of these moths; in the evening they are a nuisance to young collectors who have not learned to distinguish them by their manner of flight. Of the small moths there are at least two species of *Lithocolletis* (*Corylifoliella* and *Pomifoliella*) whose larvæ feed in the leaves of whitethorn at two periods of the year. There are between forty and fifty species of *Lithocolletis* (one of the handsomest genera of small moths) in Britain, some of which will be hereafter alluded to; but I may here give an idea of their natural history. The larvæ

all feed solitarily beneath the cuticle of leaves, some on the upper and some on the under side, and once having entered a leaf they never shift to another. They first loosen the cuticle to the full extent required for the mine, which then appears like a blotch ; they then go on to eating the fleshy parenchyma within the prescribed circumference, lining with silk the apartment that thus grows around them by the separation of the cuticles, until, by the time they are full-fed, they find themselves in a capacious chamber covered with tapestry, which is to serve for their mausoleum. The larva assumes the pupa-shroud, lies its appointed time, and then breaks forth—a living gem. The pupa-skin remains projected half way through the skin of the leaf. In the winter the pupæ, concealed in the leaves, afford food to many kinds of small birds, which may often be seen industriously seeking for them. The larvæ of several species of *Nepticula* feed in the leaves of whitethorn, and those of *Laverna atra* in the fruit.

The whitethorn often grows up in hedges to the dignity of a tree, and its blossom is resorted to by thousands of insects : shake or beat a branch of the next you come to and see : the difficulty is to distinguish the little ones among the countless snow-white petals that have covered your net. The wood of whitethorn feeds some beetles—one in particular I may mention, *Hedobia imperialis*, which is sometimes beaten out, and sometimes caught flying about the hedges.

It is not often that blackthorn alone forms a hedge, but it is commonly found in such a situation mixed with whitethorn. It is well known from its habit of flowering early in the year, before its leaves have appeared, and several species of Lepidoptera avail themselves of the banquet the flowers

offer to them. In the middle of April, *Vanessa Io*, *polychloros* and *Urticæ*, with *Gonepteryx Rhamni*, may be seen, sometimes in great numbers, flying about and settling on the flowers: all these specimens have hybernated. At night some of the early *Noctuina* frequent the same flowers.

In the stems of wild roses growing in hedges some of the wild bees (*Prosopis*, &c.) make burrows and deposit their eggs. In the fruit a Lepidopterous larva, never yet reared to perfection, feeds, leaving it when full-fed. In the leaves the larvæ of two species of the smallest moths (*Nepticula*) make labyrinthine galleries.

Brambles growing in and about hedges nourish many insects. Many bees burrow in the stems; the flowers are great favourites with bees, butterflies and moths; the leaves are mined very conspicuously by the larvæ of *Nepticula aurella*, and afford food to some of the larger Lepidoptera, among which may be mentioned the beautiful *Thyatira batis*.

The honeysuckle—

“woodbine

Of velvet leaves and bugle blooms divine,”

as Keats has it—feeds the larvæ of several small moths: *Gelechia Mouffetella* and two or three species of *Tortrix* roll up the leaves, *Lithocolletis Emberizæpennella*, *L. trifasciella* and *Perittia obscurepunctella* mine them, each in its own peculiar fashion, as also does the larva of a dipterion; and the flowers are beloved by the larva of the 20-plume moth (*Alucitina polydactyla*).

While the hedges are yet bare, as early even as the month of February, ere yet appear the

“ daffodils

That come before the swallow dares, and take
The winds of March with beauty—violets, dim,
But sweeter than the lids of Juno’s eyes,
Or Cytherea’s breath; pale primroses,
That die unmarried ere they can behold
Bright Phœbus in his strength;”

on mild evenings moths may be seen flitting along at the road-sides, especially near fruit-gardens: mostly all of them are *Hibernia rupicapraria*. When autumn has again rendered the hedges leafless, other species of moths again flutter about them in the evening; such are *Hibernia aurantiaria* and *defoliaria*, and one species, *Cheimatobia brumata*, or winter moth, gambols merrily throughout November and far into

“ drear-nighted December.”

In the extreme suburbs of London, where it is neither town nor country, but the latter still strives to predominate, the street gas-lamps attract all the above species, and on mild evenings a dozen may be seen on each of them.

Hedge-row timber feeds many insects; but often, in consequence of the barbarous custom of lopping off all the branches, the leaf-eaters are removed beyond the reach of the collector. The stems of such trees, however, sometimes render some good beetles under the bark. Old elm-trees always yield that too common pest, *Scolytus destructor*; ash trees, *Hylesinus Fraxini*; and in the decayed wood of the latter trees live the larvæ of *Dorcus parallellipedus* and

Sinodendron cylindricum. In August the beautiful moth *Cosmia diffinis* inhabits the elms, from which it may be beaten. The suckers of elms, which frequently form the hedge where those trees grow, yield several nice small moths: *Lithocolletis Schreberella*, *Nepticula marginicolella*, *N. viscerella* and *Coleophora Limosipennella* may be especially mentioned, while *Grapholita trimaculana* and *Coleophora coracipennella* are in the greatest profusion, nearly every leaf bearing the white mark of the attacks of the latter species. The larva of the large tortoiseshell butterfly feeds on the leaves of the elm, and though the species is generally distributed it is somewhat local. At the door of the Fox and Hounds, Darent Wood, is an elm which annually rears a brood of these caterpillars: it seems to have a preference over the neighbouring trees, though collectors always carry off quantities of larvæ.

The larvæ of the buff-tip moth (*Pygæra bucephala*), though feeding on several other trees, are very partial to the elm. They are gregarious, and their presence may often be discovered by seeing the quantity of their excrement on the path under the branch where a colony exists: looking up, you will see the branch deprived of leaves. Although so common in the larva state, the perfect insect is rarely obtained but by breeding or attracting by the lamp.

On ash trees growing in a hedge in the Isle of Wight the blister-beetle (*Cantharis vesicatoria*), rare in Britain, has been found more than once.

Of the plants growing in and about hedges and road-sides, and producing insects, I will mention a few that occur to me.

Agrimony (*Agrimonia eupatoria*), once valued for its medicinal qualities, has lately been found to produce a little moth, *Nepticula aurella*: the larva of the same species is also an inhabitant of the bramble leaves.

The toad flax (*Linaria vulgaris*) is the food-plant of the larvæ of a very pretty moth (*Eupithecia linariata*). They eat the seeds, and are not uncommon in many places in the autumn: the moth is produced the following year. A small weevil, *Miarus Linariæ*, is found on this plant.

The ground-ivy (*Glechoma hederacea*), that gladdens the bank of many a hedge-row, where its

“purple blossoms show,
Like helmet of crusader knight,
Its anther’s cross-like form of white,”

has its leaves eaten by the larvæ of *Coleophora albitarsella*, which attach themselves to the under side, and betray their presence by the white marks their eating causes to appear on the upper side. They live in long slender black cases, shaped somewhat like the sheath of a sword, and, hatched in autumn, live all through the winter and spring, becoming moths in June and July.

The larvæ of a fly, *Cecidomyia bursaria*, form curious little protuberances on the upper side of the leaves of ground-ivy, which eventually fall off, leaving small round holes. They are not uncommon.

A species of *Coleophora*, *C. solitariella*, is attached to *Stellaria holostea*, whose white, starry flowers illuminate the hedge-rows in the early summer. Like the larva of *albitarsella*, and probably all the species of the genus, this feeds

in the autumn, lives through the winter, and feeds far on in the summer before it undergoes its final change. It has been found both in autumn and spring, and its whitish cases are very conspicuous, two or three often hanging on one leaf and looking like growing oats.

The same plant also serves to feed the larvæ of *Gelechia tricolorella*, the young terminal leaves being selected and twisted together. Another insect of the same genus, *G. maculea*, also is attached to the same plant; but, after feeding upon the young leaves, just like *G. tricolorella*, it enters the capsule and eats the seeds. Another *Gelechia*, *fraternella*, rolls up the young leaves of *Stellaria uliginosa* in a similar manner. All these larvæ are to be found in the early spring.

The woody nightshade (*Solanum dulcamara*) has its leaves mined in blotches by the larvæ of *Röslerstammia pygmaæna*, two of them sometimes working together. When they have eaten enough they come out of the leaf, and, finding a secure place, make beautiful reticulated cocoons, within which they become pupæ, and are perfected in September and October. The larva of another species of this genus of moths, *R. granitella*, feeds in a similar manner on the flea-bane (*Inula dysenterica*), a plant which is not rare in wet places by road sides; and on this plant is also fed the larva of *Ebulea crocealis*, one of the *Pyrulina*, the pupa state being assumed among the leaves.

The *Solanum dulcamara* is likewise the food-plant of *Gelechia costella*, the larvæ of which mine the leaves and also eat the fruit, and in the autumn bore into the stems, where they assume the pupa state and come forth perfect in May.

The dwarf convolvulus (*C. arvensis*), when it grows in hedges, is often the food-plant of the larvæ of a very curious little moth, *Bedellia somnulentella*: the species seems to be local, but when it does occur it is abundant. In 1852 it was common in several places; it was not afterwards seen until 1855, and not then in all the spots where it was before observed. The larva mines the leaf, making conspicuous white blotches, and keeps its tenement clean by ejecting all its excrement; when full-fed it comes out and suspends itself, changes to a pupa and so remains for ten or fourteen days, and then emerges a long-winged, slender creature, very retired in its habits, dropping to the ground upon the slightest shake of its resting-place; and thus very rarely seen unless it be bred from the larva. The caterpillar is sometimes found on the larger convolvulus (*C. sepium*).

The leaves of the wild apple trees are mined by the larva of *Lithocolletis Pomifoliella* and *Nepticula Malella*. Another beautiful little moth, *Cemiostoma scitella*, is also nurtured in the leaves: the black blotches, so conspicuous thereon in autumn, are the signs of the presence of the larvæ, which feed under the cuticle, each beginning at a point and proceeding round and round it, every time, of course, enlarging its walk, and leaving as many concentric rings as it has made journeys, reminding one of the firework called a Catharine-wheel. The moth, which also is reared on leaves of hawthorn and mountain ash, is one of the most beautiful creatures imaginable, of a delicate greyish white, with a star of blue and gold at the tip of its upper wings.

The dog-wood in hedges is favoured with the attentions of a little moth, *Elachista Treitschkiella*, though these are paid

in such secrecy that they are seldom seen by mortal eye. But the larvæ are conspicuous enough, or rather the white places they make by mining the leaves are easily seen, especially after the miner has finished his work and gone out to assume his pupa dress, which he does within an oval shell cut from the leaf in which he fed; the hole left showing he has made his exit. I have taken another allied moth, *E. Pfeifferella*, among the dog-wood, and suspect it has a history similar to *Treitschkiella*.

Rhamnus catharticus, or buckthorn, in some districts frequent in the hedges, feeds several larvæ. *Gonepteryx Rhamni*, or the brimstone butterfly, lays her eggs on this plant, and also on *Rhamnus frangula*, early in the year; they hatch in May, the larvæ feed up in June, and become butterflies in July and August. Many specimens hybernate and come forth whenever the weather of the following spring is mild, sometimes as early as February, often in such fine condition that it has been supposed they had remained in the pupa state all winter. This is the real history of the insect, but some persons are inclined to believe in a fabulous one, thinking that there are two broods—that is, two perfect generations in a season; but hitherto all the facts observed respecting this insect are against the theory. An animated controversy on the subject has been carried on in the pages of the 'Zoologist' for 1855.

Nepticula Catharticella, in the larva state, feeds in the leaves of *Rhamnus Catharticus*, generally in abundance where it occurs, so also does *Bucculatrix Frangutella*. On the leaves also feed the larvæ of *Scotosia vetulata*, when young rolling up the leaves like *Tortrices*. *Laverna Rhamniella* and

Eupæcilia Sodaliana are beaten out of buckthorn bushes: the larvæ probably feed in the wood, or possibly in the fruit.

In his remarks on digging for pupæ, the Rev. Joseph Greene says of hedge-rows, "It is perfectly useless to try them. I do not think I have found a dozen pupæ in such places: *why* it should be so I cannot tell." Neither can I, considering the variety of plants in and about hedges which feed Lepidopterous larvæ. It may be that, on account of the number of stems in a hedge, the pupæ are more hidden, and so more difficult to find; but *they must be there*.

Hedges afford shelter to many Lepidoptera, *Geometrina*, *Tortricina* and *Tineina*, and numerous beetles and other insects, which may be obtained by beating. The flowers growing alongside hedges also give Lepidoptera, by beating and sweeping; and hosts of beetles, bees, saw-flies, flies and Hemiptera frequent such flowers all through the summer.

Hedge-banks are favourite places with wasps in which to build their nests. In some seasons you cannot go far without seeing a wasps' nest, in others they are scarcely to be found. Mr. Smith,* in 1843, enumerated two British species of ground-wasps, *Vespa vulgaris* and *V. rufa*, but he has since† seen reason to believe that he had included two species under the former name, and has now given their distinctive characters, and the name of the distinct species as *V. Germanica*, Panzer. Of the difficulties of the investigation let Mr. Smith speak: "A few words will show that, although I felt satisfied eight years ago that I was justified in the conclusions which I then came to, the difficulties which attach to the discrimina-

* 'Zoologist,' 1843, p. 161.

† Id., App., 1851, p. clxxiii.

tion of these species I had not then surmounted; and I have since learned that nothing but an examination of *entire broods* and the detection of permanent characters are safe guides. I had at that time in my possession several pairs of wasps taken *in coitu*, the female of *V. vulgaris* with *var.* 5 of the male, which I at that time considered *identical* with the male of *V. Germanica*; then again, I possessed true males of *V. Germanica*, taken connected with the true female, but I had not discovered the specific differences which I now lay down. I had also in winter found females of both species in the same nest: this I do not now consider evidence of much moment, as wasps, when seeking winter quarters, may be expected, without any improbability, to avail themselves of the same hybernaculum. The conclusions at which I have now arrived are the results of much observation. I have examined not fewer than from eight to nine thousand wasps, about one-third of which I have either extracted from the cells, or they have been developed whilst the brood-combs were in my possession. Still it will require some attention and careful comparison before the workers and the males of the two species can be readily separated, particularly the latter sex, when *var.* 5 of *V. vulgaris* closely represents the male of *V. Germanica*. A little practice will, however, overcome this difficulty. Notwithstanding all the care I have taken—all the pains I have bestowed upon the enquiry—I do not flatter myself that all difficulties are cleared away. I know too well that in many instances local varieties are met with, differing considerably from what may be regarded as the typical representatives of the species; and it is quite possible that a careful anatomical investigation might result in the discovery of more

permanent characters whereby to distinguish the species than those which I have laid down; but I have endeavoured to point out such as can, certainly with much advantage, be used by every one. Those resulting from anatomical research would be, in all probability, too recondite to admit of general application."

Every wasps' nest originates with a single female which has survived the winter. Having selected the place for the nest she sets to work and burrows about two feet deep into the earth, and, having proceeded as far as she requires, she hollows out a chamber and begins to build her nest. The material of which this is formed is generally the surface of weather-beaten wood,—wasps may often be seen rasping oaken park-palings,—but sometimes other vegetable matters are used. These fibres are moistened with a viscid matter supplied by the wasp, and worked by her into a pulp; the substance, when its manufacture is complete and dry, being, both in appearance and texture, very much like coarse grey paper, and with this the nest is built. Beginning at the top of the chamber, the wasp builds downwards, placing the paper in sheets one within the other, but not joined together, until twelve or fifteen of them are accumulated and the thickness is more than an inch. So she proceeds until the nest is as large as a cup, when she begins to make hexagonal cells for the eggs she is ready to lay. These cells, made side by side, form combs, which, unlike those of the honey-bee, are placed horizontally, and when one terrace is complete another is proceeded with, being suspended to the one above by slender rods about three-quarters of an inch in length, a space being left between each; and so on with

others. As soon as a few cells are ready an egg is deposited in each; the larvæ hatched therefrom in a few weeks become perfect wasps and assist in the labour of building the nest. Throughout the summer the community is thus continually increased by fresh inhabitants, "to the manner born," and the nest is enlarged in a ratio proportionate to the requirements of the society and the labour bestowed. Other females are hatched to assist the original founder of the community in her anti-Malthusian labours, so that by the end of the autumn, it has been computed, a wasps'-nest contains from 10,000 to 16,000 inhabitants; but just at this period winter comes and deprives them of food out of doors, and, not having accumulated any within, the whole population, except some of the females, who survive to found new colonies in the spring, perishes.

Every country boy has assisted to take a "waps's nest," but few have made any enquiries into its structure and the economy of its tenants. And if they had, who could have directed them? They would probably have had for answer, "to mind their business." Alas! how many a philosophic light has thus been extinguished at its first glimmer!

The banks under hedges are grand places for taking insects with the sweeping-net, and a keen glance from the collector, as he walks along, net in hand, will often detect a fine creature enjoying himself to the top of his bent, like any philosopher when master of the situation. *Drilus flavescens* is found on hedge-banks by sweeping. The male beetle does not present anything remarkable: he is of a light brown colour, about a quarter of an inch long, and with longish pectinated antennæ: the female has a large and long body of an orange colour, has no wings, and the antennæ are short

and simple. In the larva state this beetle, like its near relative the glow-worm, is carnivorous and feeds on snails; but, unlike it, the perfect female bears no light at night, and is consequently seldom seen.

The different species of St. John's wort (*Hypericum*) grow in many situations, but it is only when they are on a hedge-bank or similar sheltered place that they are of full value to an entomologist. In May and June the larvæ of the beautiful *Depressaria Hypericella* screw up the tops of the young shoots: in June the larvæ of *Gracilaria auroguttella* make their characteristic cones of and on the leaves; in July the beetle *Chrysomela Hyperici* abounds, the larva feeding on the plant in June; in October the second brood of *Gracilaria auroguttella* larvæ is seen, and when looking for the cones you may see the leaves marked with brown tortuous lines, which are the mines of *Nepticula Septembrella*.

The Germander Speedwell (*Veronica chamædrys*), the delight of every pedestrian along the hedge-banks in May, feeds the larva of *Pterophorus fuscus*, one of the plume moths, the flowers are beloved by the moths *Micropteryx Seppella* and *Adela fibulella*, and by *Andrena cingulata*, *A. minutula* and other bees.

Lanes and roads are favourite places of moths for flight, and occasionally a good moth is captured. Some of the large dragon-flies delight to roam up and down a road, and you may see them flying backwards and forwards for a certain distance for hours, taking their "constitutional" even when it is quite dusk. Beetles also are fond of roads, and a habit of pondering the paths of your feet will now and then reward you with a "good" one.

The largest of our British Coleoptera, the stag-beetle (*Lucanus cervus*), is common in June on roads, in localities where there are old trees. In the high road which runs through the village of Mickleham, in Surrey, these beetles abound, so also do they about Lee, in Kent. Their long curved claws enable them to cling with great tenacity to the object on which they move. They fly at dusk, sailing along majestically, as becomes "the king of beetles," as this species has been called: in the day-time they are not rare on posts, palings, &c., and in the morning the paths are strewn with the bodies of individuals who stumbled when coming home late the night before, fell, and were crushed beneath the feet of the passers by. The males have large projecting horny mandibles, but the female is furnished with these oral appendages in a very moderate degree. Whence this discrepancy? As usual in insects, the advantage in the way of ornament is given to the male sex, the female being almost invariably less conspicuous. The larvæ of the stag-beetles feed in the timber of old trees, and are said to remain three years before they arrive at maturity.

Lime trees often grow in hedges or overhang roads. They are not much attacked by insects; that is, the leaves and wood are not eaten by many species, but when in flower they are never free from bees by day and moths by night. For some years a party of us used to visit the limes on Clapham Common, armed with lanterns, long sticks and a large sheet: into the latter we beat the wide-spreading boughs, to the astonishment alike of moths, policemen, boys, men and maidens. *Agrotis corticea* was not uncommon; I think it was the best moth we took: there was a sprinkling of wasps

and bees, and hosts of tiny flies, to which we paid no kind of consideration; though they annoyed they did not hurt us, and we let them alone as much as possible. The human spectators of our sport evidently thought us demented: they made up their minds at last that we were catching gnats!

In the 'Zoologist' for 1855, p. 4814, Mr. John S. Ashworth, writing from Bryn Hyfryd, North Wales, says:—" *Æcophora 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."

By "fence" is here evidently meant a hedge.

The elder, a regular hedge-row tree, has a tolerable immunity from the attacks of insects; but its sweet flowers are haunted by several beetles, of which I remember especially two: the beautiful green *Aleurostictus nobilis*, which I used to take in abundance on the trees at the side of the river Thames at Putney, and *Athous Campyloides*, one of the *Elateridæ*, of which a few only were once taken at Ramsgate: the latter is a great rarity, but it probably only requires to be looked for to prove that it is only scarce in collections.

During the year 1855 the Entomological Society has had the subject of the galls formed on oaks by the larva of *Cynips*

lignicola several times brought forward at the meetings. It is peculiarly interesting, not only as an example of the singular nature of the formation of galls in general, but also because this kind of gall has never until recently been noticed in England, and now so abundant are the galls in certain districts that the trees have suffered great injury, and in some cases have been killed. One gentleman, who forwarded specimens from Devonshire, wrote as follows last January:—"The galls 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.”*

Every one who has casually looked at the leaves of the dwarf oaks growing in hedges or among underwood, must have seen the curious round formations attached to their under side. The cause of their formation was long an enigma, but Mr. Smith has communicated to the Entomological Society† the following solution:—“ In the beginning of March, in a mossy hollow at the top of Coombe Wood, were large drifts of oak leaves. Most of the leaves had these excrescences on their under sides, but they were dried up and withered as well as the leaves. He broke many of them, but to no purpose; they appeared to be nothing but remains of withered fungus. He next removed large masses of leaves, and found that those more towards the bottom of the heap, although withered themselves, had the fungus upon them quite fresh, as when on the trees in summer. He cut open one of these, and to his astonishment a small black insect, with four wings and rather red legs, crawled out. He then opened a great many of these apparently fresh ones, and out of each extracted a fly. This led him to further observation; when he found that those leaves, which, from their depth under the mass, had been kept moist, produced the perfect insect,—those which were lower down and soaking wet, contained the insect in an earlier stage, and some which he found in a water-course

* ‘*Zoologist*,’ 1855, p. 4640.

† *Trans. Ent. Soc.*, ii., xliii.

had merely a small grub, so nearly resembling the pulp of the gall (as he supposed he might call it) that it required some attention to distinguish it. The galls on the leaves on the surface of the heaps, as he before observed, were dried up. He also examined some of the leaves which still remained on the trees, but although they were covered with galls, they had withered, and consequently the insect had perished. So that it appeared that the insect must remain in the egg state until late in the autumn, and that its development is the result of the accident of the leaf being so situated during the winter months, that it shall acquire a sufficient degree of moisture to keep the gall in a fresh or growing state, to serve as nutriment for the insect, which, he should imagine, is nourished by its juices. He found two or three flies among the leaves already developed, but from the various stages in which he found the insect in the galls, he concluded that the majority would be some weeks before they would make their appearance.

“The leaves which had the galls on them containing the fly could hardly be moved without their falling off. Those in an earlier stage were attached more firmly, and the withered galls adhered rather strongly.”

The insect proved to be the *Cynips longipennis*, Fab.

The subject of the formation of galls is very curious and interesting. There are many kinds of galls, some very much alike, others differing greatly in appearance. Some plants, the oak, for instance, support several kinds, others only one. From some galls many insects proceed, others have only one inhabitant. The insects which cause the growth of galls, called *Cynipidæ*, or gall-flies, are very

peculiarly formed, one singular point in their structure being that the number of joints in the antennæ differs in the sexes. The ovipositor of the female has the power of boring into leaves, stems and roots of various plants; in the aperture thus made the egg or eggs are deposited. The growth of the gall soon commences; but the means of the increase of these formations, each kind differing according to the species of fly whose larva is within, has never been determined. They are supposed to arise in consequence of an irritating fluid injected by the female when the eggs are laid. As the larva grows it feeds upon the gall, which increases also, contrary to all analogy in vegetable structures attacked by insects. The larvæ of some species leave the galls to undergo the change to pupæ; others are transformed within the precincts of their dwellings. The ink-galls of commerce are the produce of a *Cynips*, so also are the celebrated apples of Sodom,* the

“Dead Sea fruits that tempt the eye,
But turn to ashes on the lips.”

Some, perhaps all, of the species of *Cynipidæ* are kept in check by parasitic insects.

* Trans. Ent. Soc., ii., p. 14.

§ VI.

THE FENCES.

“ The mossy pales that skirt the orchard green.”

ROGERS.

“ Old walls that crumble to decay,
With ivy crowned, with lichens grey,
Where mosses flourish, and the fern
Softens the outline else so stern.”

ANON.

THE history of enclosures would be very curious. Who knows, when he walks round one, whose property it originally was,—how or by what right it came to be sequestered from the common or forest,—whether it was acquired by might from right,—or was lawfully disposed of? Little did he who put a fence round it think that while he was securing his estate from men or other large animals, that the very structure itself by which he attained his object would become the fortress in which enemies, with a reversionary life interest in the material, would mine unseen and eventually work its ruin. Yet so it is. No sooner is a wooden paling put up than wood-eating beetles attack it; the holes and galleries they form admit the air and moisture, and decay begins.

The oak-palings so common in the South of England, which are fitted so close that Godiva might have ridden on one side of them quite secure from the prying eyes of Peeping Tom on the other, are less subject to the attacks of boring beetles than the palings of softer wood, yet the *Anobia* and *Lyctus oblongus* are not deterred by the hardness of the wood, but pierce them in all directions. The latter beetle, a narrow fellow with a deep hollow in his thorax, is especially fond of new palings, and may be seen on them in abundance; after the second or third year he retires in favour of the *Anobia*, which have a more antiquarian taste.

The open fences are more attacked than the close ones, possibly because they are formed of stouter stuff, for your wood beetles generally are true countrymen, and hate your thin slices. Out of an elm-post, just below the bark, I have taken *Callidium variabile*, smothered in the dusty *débris* of the wood. Why it was I know not, but, as has been seen before in this species, and hence its name, the members of this community were dressed in differently coloured suits, some light brown, some darker, and others blue; a singular circumstance when we consider they were all of one brood, and had been subject to the same conditions. In the solid wood of the elm I have also found the pretty banded beetle *Clytus Arietis*, which works its way out, when perfect, through round holes. This beetle is not particular, however, in what wood it lives: another species, *C. mysticus*, has also similar tastes, but is not so abundant. In old elm-rails have been found both larva and imago of a rare beetle, *Nemosoma elongatum*; once by Mr. T. Ingall, in profusion, near Sydenham. A very elegant long-horned beetle,

Callidium violaceum, attacks fir-railings immediately beneath the bark: a very different looking beetle, short and stout, *Anobium molle*, is found in similar situations. Pull off a piece of the bark in May or June, you will probably find dozens of larvæ, pupæ and perfect insects in and below it.

On posts and palings, and also on banks, may frequently be seen beautiful four-winged flies, the head and thorax of a brilliant metallic blue, and the abdomen of a burnished copper colour. These flies belong to the Hymenopterous family *Chrysididæ*. They are parasitic on various species of Fossorial bees and other Hymenoptera, feeding on the larvæ.

So much for the substance of the palings: the surface, however, is the grand attraction for multitudes of insects, and consequently for the collector. You see a man in the early summer, with a coat full of pockets, a slouched hat, shoes covered with dust, and a stick in his hand, walking slowly by the side of a paling, heedless of other passengers, and with his eyes intently fixed on the fence. You would not guess what he is there to do. He is an insect-hunter. He knows by tradition or experience that a great many kinds of insects, moths especially, resort to palings for shelter during the day, where they sit fast asleep, generally under the protection of some slight projection or the leaves of a plant or grass, but frequently quite exposed to view. The large night-flying moths he will pin without their exhibiting any sign of life or feeling, and in his collecting-box, if he does not kill them on the spot with oxalic acid, they will probably remain motionless until their usual hour for flight comes round. For the small moths he must put his eyes

close to the fence—like a greyhound, he hunts by sight alone. If a good brisk wind blow over the paling, not *on* it, so thick will these little fellows be, particularly if there be trees on the other side, that a few yards may take him an hour to look over. These little moths are taken in small pill-boxes; but, as if the moths knew the man's intentions as well as himself, no sooner does one of his boxes come in sight than the instinct of self-preservation becomes active, and the desired victim is off. Though the collector had his eye on him, and knew what His Slyness would do, he could not follow his movements; so he makes up for the loss, often a sore disappointment if the little beauty was a rarity, by looking out for fresh game. He succeeds at length in inverting his box over one, hoping his prey may take refuge in it, when he will secure it by quickly slipping on the lid; but it often happens that the moth is not to be so caught, he knows there is a trap set for him, and waits quietly until it is lifted up, when the hunter has just time to see him, and that is all. When the moths are secured in the box, they remain there until dead; the box being placed in a tin of cut laurel-leaves when the collector gets home, to accomplish their death without injuring their plumage. The large moths and *Tortrices* sit closely appressed to the surface of the palings, and so do some of the smaller ones, but the position of some of the *Tineina* is very curious and characteristic of their genera. *Argyresthia* sits with its head down, as in a posture of reverence; *Gracilaria* and *Ornix*, on the contrary, hold up their heads, bold and pert; *Elachista* looks as if it tried to squeeze itself into the wood, and *Nepticula* hugs a corner or crevice, and then, as if not satisfied with its station,

hurries off to seek another, with a self-important swagger, truly ridiculous in such a little creature. It is very essential while searching a fence to have your ring-net ready for any shy creature that will not stand your gaze: some of the *Geometrina* have this habit. It is also a good plan to brush down into your net the lichen that grows on old palings; some small moths, beetles, &c., hide themselves therein, and would be otherwise overlooked.

We find the curious triangular cases of *Solenobia inconspicuella* in March, on palings covered with green lichen, the larvæ within them being content with that humble fare. In the same situation, but later in the season, we also meet with the rounded cases of the larvæ of *Xysmatodoma melanella*, also lichen-eaters, and occasionally those of the larvæ of *Diplodoma marginepunctella*, loose, shaggy habitations, composed of earth, wood and fragments of snail-shells, held together by a slight web of silk. The long, tough, angulated cases of the larvæ of *Talæporia pseudo-bombycella* are frequent on palings, and occasionally those of the larvæ of *Fumea nitidella*. The latter are rough, shapeless tenements, composed of bits of grass stems. All these cases are carried about by their inhabitants, and serve for their habitations until they assume the perfect state, and even afterwards in those species where the females are wingless.

Sometimes an insect may be found on a fence, to which it has come by accident. Thus I once took the very rare and beautiful beetle *Dyctiopterus minutus*, in the month of September, climbing up the fence of Addington Park. In the month of June *Throscus dermestoides* occurs on the same fence. The banks on which fences are sometimes elevated

are generally good places for sweeping. Not rarely a good insect may be seen sunning himself thereon. The fine *Chrysomela Gættingensis* I have thus sometimes found. The grasses on such banks are the favourite food of several species of *Elachista* in their larva state; some, however, prefer the grasses in ditches and hedge-banks, others those growing on the downs. The discovery of these larvæ is only two or three years old, and already many different species have been found. They mine the foliage of the grasses, some in a manner scarcely perceptible until the grass is held up to the light; with others, such as *E. gangabella*, the mine is puffed out like that of a *Lithocolletis*. As the frail nature of a grass does not long withstand such attacks, these larvæ are obliged to leave their mines when full-fed, and they assume the pupa-state suspended to a stem or the surface of the palings

The palings near London that have been found most productive to collectors are those round "Baldwyns" at Dartford Heath, the special locality, in April, for *Aleucis pictaria*, one of our rarest moths; at Addington Park, where the fine *Notodonta Carmelita* has been taken more than once early in May; at Richmond Park; at Champion Hill and Love Lane, Camberwell; at Bexley and at Blackheath. But there are doubtless many other good palings: only in searching any fences, bear in mind that it is all but useless to look if the wind blows on them; and I would offer one other word of advice, namely, that if you see many specimens of an insect, not to neglect to take several because they are common. It is possible that it may be a rare species, of which all your friends will be glad: you perhaps find this

out next day, but it is then too late: there will probably not be one on the fence, though the weather remains the same; but it often happens that twenty-four hours bring a change of wind and temperature, which lasts long enough to give you no chance of again seeing creatures whose duration of life at most is a week. This hint is available for other localities than fences, as every collector learns, after very brief experience.

Brick walls are not favourite resting-places with moths; but some species may occasionally be found thereon. It used to be a puzzle where a little moth, *Gelechia domestica*, often found in and about houses, came from; now it is no longer a mystery, for we have found that its larva feeds on mosses growing on garden-walls. In company with it we also find the larva of another species of the same genus, *G. affinis*, and those of a larger moth, *Eudorea frequentella*. Two ferns which love old walls, *Asplenium Ruta-muraria* and *A. Trichomanes* are the food-plants of *Lamprosetia Verhuellevella*, a little black moth, very scarce in this country at present, probably because we have not yet discovered it in the larva state. The larva walks about enveloped in case, and may no doubt be had by looking for it where the above ferns abound: at any rate, the perfect insect ought to be taken in such places, but let whoever finds it know beforehand that it is a most delicate creature, and most easily rubbed, even for a moth.

There are two moths, however, which are always found upon walls, the reason being that their larvæ feed on the lichens or mosses which grow there. These moths are *Bryophila perla* and *B. glandifera*, pretty creatures, whose

delicate whitish wings are mottled with dark green. The former species is generally distributed, the latter is more local; I have received it from the neighbourhood of Bristol. It used to be taken near London, but has not occurred in its old localities for years. Forty or fifty years ago a collector was one day looking for it in the Kent Road, and his earnest gaze at the old wall attracted the attention of two women passing by, who, after wondering for some time what he could be seeking, ventured to ask him. "Looking for the Bishop," was the answer. "Poor fellow!" said one to the other, "he *is* mad." The moth is known to the suburban collectors by the name of "the Bishop;" how it came to have this appellation is a mystery; rare is it to hear of a bishop going to the wall, though once Elizabeth did threaten to unfrock one. No wonder the collector was accounted mad.

Some of the wild bees make their burrows in the mortar of old walls; and in such situations a parasitic beetle, *Sitaris humeralis*, rare in England, has been found. In his 'Insect Architecture,' Rennie describes a nest of a mason-bee which he found on the wall of Greenwich Park. He says, "Externally there was an irregular cake of dry mud, precisely as if a handful of wet road-stuff had been taken from a cart-rut and thrown against the wall; though, upon close inspection, the cake contained more small stones than usually occur in the mud of the adjacent cart-ruts. We should, in fact, have passed it by without notice had there not been a circular hole on one side of it, indicating the perforation of some insect. This hole was found to be the orifice of a cell about an inch deep, exactly of the form and size of a lady's thimble, finely

polished, and of the colour of plaster of Paris, but stained in various places with yellow.

“ This cell was empty ; but, upon removing the cake of mud, we discovered another cell, separated from the former by a partition about a quarter of an inch thick, and in it a living bee, which, as we supposed, had just changed from the pupa to the winged state.” This bee is called *Anthophora retusa* by Rennie, but Mr. Smith has referred the *A. retusa* of Kirby to the *A. acervorum* of Fabricius, the *A. retusa* of Linnæus being distinct, and it is not clear which of the species Rennie’s bee was.

Of all wall-plants the ivy is the most productive to the entomologist ; I allude to the time when it is in flower. When it grows round trees and in hedges it is quite as attractive to insects, but is not generally so accessible to collectors, or if it can be reached it is, in such situations, not easy to capture the insects settled on it. By the end of September, when the field-flowers are becoming scarce, and those that remain are small in size and deficient in odour, the ivy-blossoms begin to open, and by the middle of October the whole plant is a mass of bloom. Then the autumnal butterflies, among which the beautiful *Vanessa Atalanta* and sometimes *V. Cardui* are conspicuous, crowd upon the flowers by day, accompanied by honey-bees humble-bees and hosts of flies, which rise up with a buzz as you approach. But it is as daylight wanes that the great excitement of the entomologist commences, for then the nocturnal moths wake up, and, attracted by the sweet odour of the flowers, come trooping in to the feast of nectar bountifully prepared for them. As the gloom in

creases the concourse augments, until at length the bush is alive with the silent revellers. Then the pleasure of the entomologist culminates, and he trembles with excitement. Such at least was my experience when I made the accidental discovery that ivy-flowers were attractive to night-flying moths. Some fifteen years ago, accompanied by a friend, I had gone to Mickleham, in Surrey, about the middle of October, to try the plan of taking moths at night from the berries of the glorious old yew trees in Norbury Park, discovered to be very attractive to the *Noctuid* by Mr. Walton, who had published an account of the method he used to capture them in the 'Entomological Magazine.*' We had wandered about the hills all day, with but little entomological success, and just at dusk came into Headley Lane, one side of which, for a considerable distance, is bounded by a flint wall, then covered with old ivy in full bloom; now, alas! the plants are all removed. My friend thought he could find a way through the opposite plantation to Mickleham. I loitered in the lane to see if he would succeed, and saw a moth fly past me towards the wall, followed by another and another. Drawing close to the wall I saw moths flying about the ivy in dozens: I caught one or two to prove to my friend that I had not had a vision, and hurried off to the village, where my companion soon after arrived. We were not long in retracing our steps, provided with bull's-eye lanterns, nets and pins. Arrived at the place, it being now quite dark, we lighted our lanterns, and lo!

* Vol. ii., p. 205.

what a scene awaited us. We had expected to find the moths still flying about the ivy, and to catch some of them with difficulty. Neither supposition was right: there was not a moth on the wing, but the whole bush, which overhung the road most conveniently, was full of the beauties, quietly sipping the honey of the flowers, and though we turned our lights full on them they heeded us not. Fancy our delight! Judge of our ecstasy! There are no words to paint the emotion. Deer-stalking would be tame in comparison; bison-hunting nothing to it. For here was not one individual prey, nor even several of one sort, but hundreds of creatures of a dozen different kinds, of which we had only seen dry specimens in cabinets, all alive and within our power, and new to our possession. Their eyes shone like constellations, and we paused awhile, paralyzed with the enchantment of the scene. When we found they were still not scared at our presence, we shook the ivy over a net, and selected the specimens we wanted at our leisure, letting the rest escape. I need not record the names of all the species we took, as the plan pursued has since been extensively followed, and the species of autumn moths to be thus taken are well known; but I may mention two, *Xylina semibrunnea* and *Dasycampa rubiginea*, at that time exceedingly rare; the latter, indeed, still remains one of our scarcest species. We also took several of a scarce beetle, *Oncomera Podagrariæ*.

Stone walls are not so disagreeable to moths as those of brick. In the North the collectors take on them *Cloantha Solidaginis* and *Crymodes Templi*: the latter

species also in the heaps of iron-stone. I believe also *Polia Chi* and other northern species which I never saw alive are also found sitting on walls.

Mr. John Scott thus writes about *Chrysoclista Schrankella*, one of our prettiest small moths, of a deep orange colour spotted with black:—"The larva feeds on *Epilobium alsinifolium*. This plant I find pretty abundant here (Renfrew) at the bottoms of walls in marshy situations, and I have found as many as three or four larvæ feeding upon one plant. They are easily detected; being miners the leaf becomes discoloured, and thus their habitation is at once made known. The larvæ are to be found in May; they are of a dirty greenish brown colour, and when full-grown are about three-eighths of an inch in length. In my breeding-cages I had the insect in all its stages of larva, pupa and imago at the same time. When about to undergo its transformation, which is about the first week in June, the larva quits the interior of the leaf, and either crawls away to the bud of some plant near at hand, which it draws together with beautiful white silken threads, or it rolls half-round the edge of one of the leaves of the plant on which it has fed, and then constructs a snow-white covering, in which it changes to a brown pupa. The perfect insect appears in from fourteen to eighteen days after the transformation." *

* 'Zoologist,' 1853, p. 3778.

§ VII.

THE HEATHS AND COMMONS.

“ Soft heath this elevated spot supplied.”

“ Across a bare wide common I was toiling
With languid steps that by the slippery ground
Were baffled ; nor could my weak arm disperse
The host of insects gathering round my face,
And ever with me as I paced along.”

WORDSWORTH.

WHAT a glorious flush of beauty, a sense of ripeness and maturity, comes on one when gazing over an expanse of

“ bonnie, blooming heather,”

a floral ocean, unruffled midst the illuminating glory of the summer's sun ; with no sound audible but the murmur of the wild bees' hum. To no one, however unpoetical his nature, can such a scene be aught but delightful and suggestive. To the entomologist it is not productive of many of his favourites, but it has some specialities. Among the bees, *Colletes succincta*, *Andrena pubescens*, humble-bees (*Bombi*), the honey-bee and others are particularly partial to the flowers of heath, and except a common butterfly or two,

grasshoppers and flies (Diptera), they are almost all the insects that can be seen during the heat of the day. But early in the afternoon insect-life begins to awake, and so numerous do certain insects become that it seems impossible they should have been on the spot all the day. In May the fox-moth careers madly over the field, now close to you and now out of sight; yet "there is method in his madness,"—he is fiercely in love, and is in search of his bride, who rests passively, expecting his attentions, and good-naturedly or pettishly waiting until her lover's vagaries are over. Observe the spot he most affects, and by looking carefully you will probably see his lady-love deep among the heather or ascending the stems; then station yourself near, and you will soon have a chance of catching the rover; but, as he comes like a whirlwind, it is most likely you will miss him if you strike too soon—the Fabian policy is the best, and you will succeed by delay. The old collectors used, when they had reared a female of this and other allied species of the *Bombycina*, to take her to the locality frequented by the species, and her attractive powers rewarded them by bringing within their reach many of the males. But examples caught on the wing are always more or less rubbed. The finest specimens are obtained by breeding, but the cage in which the caterpillars are kept must remain out of doors. Mr. Henry Doubleday has given the following directions: *—"I take a large box, about ten inches deep, the bottom of which is bored with a number of holes to allow the water to drain out, and the top covered with wire-gauze. In this box I place a

* 'The Entomologist,' p. 327.

turf of heath, cut to fit it; the caterpillars are placed in it in the autumn, and fed as long as the leaves last, or until they become torpid: they are then left in the garden exposed to all the changes of the weather. The first warm days in March bring them out, and they bask in the sun for a week or two, *but never feed in the spring*. About the middle of April they begin spinning their cocoons, and by the end of May or early in June the moths appear. I have adopted this plan for several seasons, and have always had abundance of moths produced. The same plan answers equally well with the larvæ of *Phragmatobia fuliginosa* and other species that live through the winter." The beautiful *Endromis versicolor*, or Kentish Glory, has been taken, particularly in Perthshire, where it is more common than in the South of England,—the males by watching for them as they flew about the vicinity of the females, and the latter by having the place of their concealment betrayed by the attentions of the males. The "fox-moth" caterpillar feeds on clover, brambles and other plants on heaths, and commons, and may often be found in September. It is very hairy and glossy, with alternate bands of black and yellow. The larvæ of the "Glory" are not often obtained: they feed upon birch trees, and cling very tightly, so that they are not easily shaken off.

I had almost forgotten, among the day-fliers, *Anarta Myrtilli*, far too beautiful a creature to be overlooked, though you would nevertheless be very likely to do so, or at most only get a glimpse of it, so rapid are its motions. And so restless is it in the net when captured that it will probably injure itself considerably before you can secure it. The

upper wings are of a rich brown, variegated with streaks of black; the lower wings are black, with a band of bright orange across the centre. The larva feeds on the heath, and may be obtained by sweeping it in August.

In May and June, especially at dusk, the heather is alive with several small moths. *Gelechia Ericetella* rises before you in countless multitudes, accompanied by *Anchinia bicostella*. In July and August *Eupæcilia angustana* more than supplies their places, and you are startled every now and then by a *Plusia gamma*, rising like a partridge from under your feet, settling again not far off; you mark him down, uncertain perhaps what he is, but although he bears a γ on each of his wings, he has no pedantic desire to display his academic insignia, and you must be sharp to see him, much less to catch him. There is a little moth, *Coleophora juncicolella*, sometimes found amongst heather in July, but it has a perverse habit of skipping into the bush, and then you see it no more. The larva feeds on the heather, but its case is so like the foliage of the plant that it is rarely visible, unless indeed it assumes a direction contrary to the growth of the shoot.* There is a pretty little creature, *Gelechia Ericinella*, often seen among heather in August; the larva feeds in July, making "very light gossamer webs near the ends of the heather, and in these webs frequently changes to pupa."†

One of the prettiest moths procured among heath is *Chersotis agathina*. It comes out early in August, and feeds after dark on the flowers of the heather, *Calluna vulgaris*. Many a pilgrimage have I made to the heath-

* 'Entomologist's Annual,' 1856, p. 56.

† Id., p. 52.

field at West Wickham Wood, since my friend Bedell, some ten or twelve years ago, first caught a faded specimen, as we were leaving the place after it had become too dark to distinguish the moths as they flew. Then it occurred to us, and it seemed very singular that we had not thought of it before, that a lantern would be of service to us after dark; and so we afterwards went provided with the necessary bull's-eye. Noctuina we found in abundance, sipping the honey from the little heather-bells, the sweet odour of the nectar being plainly perceptible to our noses as well as theirs. Their noses? Well, perhaps this is not a correct word, but they have the power of smelling whether they have noses or not. Not only did we get our prize, *Agathina*, but some other species that were desiderata to us, *Noctua Dahlii* I remember in particular, besides commoner things, such as *N. baja*, *brunnea*, *C-nigrum*, *Scotophila porphyrea* and *Pachycnemia Hippocastanaria*.

Gelechia atrella is a moth I have always taken by brushing the heath at the side of paths in July: I fancy the larva is a heath-feeder, but I have no proof.

In the same places I find *Ochsenheimeria Bisontella*, but I cannot add a word as to its natural history.

On the heaths in the New Forest is taken the rare moth, *Eulepia cribrum*, one of the Lithosiidæ: I am not aware that it has occurred in any other locality, and even there it is confined to particular spots. These New-Forest heaths are also the great metropolis of two species of Psychidæ, viz., *P. nigricans* and *P. opacella*, which in some seasons have occurred abundantly, and in others could not be found. The larvæ are makers of cases composed of heath, on which plant

they feed ; inside these cases they live, carrying them about wherever they go. When full-fed they fasten their cases to the stems of trees, furze-bushes, &c., and undergo the change to the pupa-state within them. It is when thus spun up that the collector has the best chance of finding them. The male, when arrived at maturity, is most active and restless ; the female, on the contrary, is quiescent as a matter of necessity, having neither legs nor wings : she lives entirely within the case, where she also lays her eggs. I believe both these species were first discovered in this country by Mr. Richard Weaver, to whose indefatigable industry for many years, and in various districts, we are indebted for the knowledge of a great number of our finest insects.

In Britain there are very few species of Psychidæ, but M. Bruand has enumerated eighty-two species found on the Continent of Europe. The structure and economy of this group of moths are very curious, in some points resembling the Bombycina, in others the Tineina. Most authors have considered the insects to belong in part to the former, and in part to the latter of these sections of the Lepidoptera, but M. Bruand, who has given more attention to the group than any other entomologist, has placed them all together in one family which he considers belongs to the Tineina. In thus associating species which Nature has joined by so many general characters in common, I cannot but think he has done right, but it seems to me that a greater resemblance is shown in the majority of the species to the Bombyciform than to the Tineiform type. The probable solution of the difficulty is that the Psychidæ form a group connected at different points with many others of the Lepidoptera, which

are, to a certain extent, represented within its bounds ; and there are also reasons for thinking it forms a connecting link between the Lepidoptera and the Trichopterous Neuroptera. But I fear this is too abstruse and theoretical ; yet I cannot leave the subject without adverting to the production, among the Psychidæ, of a second generation of moths from females entirely secluded from males : there is no other way of accounting for this than by adopting some of the theories that have been put forward, and that of gemmation before alluded to in connection with *Aphides* appears to be the best. Dr. Siebold has supported it in an article which is translated and published in the 'Transactions' of the Entomological Society.*

Heaths are not very prolific in beetles, but there are some species particularly attached to them. *Cicindela sylvatica* abounds on the wide expanse of heathy ground from Weybridge to Woking. You cannot walk far without flushing one of these fine fellows, who, notwithstanding his legs are so long, trusts not to them to get out of your way, but uses his wings freely. However, the flights are not long, and with a little activity you may soon capture plenty of these beetles. Another species of the same genus, *C. campestris*, of a fine green colour, also occurs on these heaths, but it is not so local, being found all over the country on open sandy places. Like its relative above mentioned, it uses its wings quite as much as its legs, although it can run with extreme rapidity. The larvæ of both species make burrows in the ground : a description by Rusticus of

* Vol. i., N. S., p. 234.

the larva of *C. campestris*, its habitation and habits, is in the usual happy style of that author.* “Near Black-Gang Chine I had the good fortune to meet with an insect I never saw before or since. The soil was a kind of loose sand, with a good many short blades of withered grass sticking up out of it, the runners of which crawled along the top, or just below the top, as the case might be, now and then shooting down a root to hold fast by; and looking altogether as though an old tanned fishing-net had been thrown over the soil to keep it from blowing away, and had shot out and taken root at the knots, just for its own amusement, or as a hold in case the sea-breezes should be too much for it. In this place, stopping to pick up a feather, I saw something move in the sand, but as soon as I could fix my eye on it all was still, and I could only find a little hole, as round as though some one had stuck a common lead-pencil into the sand and taken it out again. There was a neat and perfect roundness in the hole, which told me at once it was a tenement of some kind, and sundry cases of beetles, legs of gnats and dried dew-moths, scattered round it, signified, moreover, that it was inhabited by some sort of inhuman Polyphemus. I was soon down on my knees, and had my knife out ready for digging, when, within a foot of the first, I saw another stir, and another round hole instantly appeared. It now occurred to me that I might, with quietness and patience, get a sight of one of these hermits while he was sunning himself: I therefore lay as still as a cat watching at a mouse-hole, and was soon rewarded by seeing the gentleman make his appearance almost under

* ‘Letters of Rusticus,’ p. 49.

my nose. Unluckily, like Alexander, I had placed myself between the sun and my Diogenes, and this seemed to make him very fidgetty and uneasy, so I obliged him by moving quietly out of the way and letting the sun shine on him, by the same movement bringing my eye within about fifteen inches of him. Nothing appeared but a broad, flat head, which fitted very accurately with the mouth of the hole, and which was furnished with bright shining eyes, and a pair of horrible jaws, held wide apart: these shears had doubtless cut the thread of existence for many a poor wanderer, whose luckless star had led him to the abode of this child of Erebus.

“I cut off the gentleman’s retreat by passing a stick into the sand sideways, so as to cross his burrow, and then, with a bit of a jerk, unearthed him and laid him sprawling. O, such a beauty! the *Parcæ*, sweet creatures, the *Eumenides*, gentle turtle-doves, were lovely in comparison: I’ll describe the animal, with an eye to entomological science. Aspect vicious; temper ferocious; jaws stuck on the wrong way, like a figure-head shipped looking aft; head big; back humped, the hump adorned with two hooks. When first unearthed, he was monstrous sulky, and lay twisted in a kind of half-kink, for all the world like a pot-hook; but he soon found the inconvenience of this, and set to work to make another hole, for which he used his feet and jaws; in this way he got down about half an inch, and then, adroitly hanging himself to the edge of the hole by the hook in his back, he continued his labours in this droll position: at last he got quite out of sight, and, as he did not come up again, I concluded he was taking

a nap after his labour, and so I would not again disturb him."

The fine *Carabus*, well named *nitens*, since it shines like burnished metal, the thorax being of a bright bronze colour, and the elytra of a brilliant green, is abundant on many heaths in the South of England, particularly in the New Forest district. Some other species of ground-beetles are also partial to heaths, in particular certain of the *Harpali*. All the species of ground-beetles are carnivorous, and the reason why some of them, like these heath-dwellers, are local, is probably that the caterpillars on which they feed are those attached to the heath.

A few vegetable feeders among the beetles are restricted to heaths. *Timarcha coriaria*, black, convex and about a third of an inch in length, is universally distributed over such ground, where it may be seen all through the season, from February to October, crawling solemnly about, like an ancient valetudinarian ordered to walk for the benefit of his health. Its more portly relative, *T. lavigata*, may sometimes be found in its company, but it rather prefers the shelter of hedges. Both these beetles, the latter especially, exude a red liquid when handled, whence they have obtained the popular cognomen of "bloody-nosed beetles."

The common brake fern (*Pteris aquilina*), the ornament of many a mile of waste, produces but few insects. There is a little moth, *Cleodora Cytisella*, which is always found among it, and, I suspect, feeds upon some part of the plant, but I have never been able to verify the suspicion. In the New Forest, *Cicada anglica*, an insect representing the Homopterous section of the Order Hemiptera, and the only

species of the genus found in England, has been taken on the fern. I made special enquiries of Mr. Wallis, one of the keepers of the enclosures in the New Forest, of whom I procured the insect, and who had repeatedly captured specimens of it, about its reputed powers of song, and he informed me that he had been asked the same question before, and had paid particular attention to the insects, with a view to hear "the song," if possible, but he never heard them sing or make any noise whatever.

Coltsfoot (*Tussilago farfara*), which thrives on banks where the soil is stiff, has some insects attached to it. The larva of *Pterophorus trigonodactylus*, according to Zeller,* who quotes Fischer von Röslerstamm for his authority, lives inside the flower-stem, and the larva of *Pædisca Brunichiana* feeds in the flower-head.

The bird's-foot trefoil (*Lotus corniculatus*), whose bright yellow flowers gild many a bank throughout the summer, has its leaves curled up by the larvæ of *Gelechia Anthyllidella* in April and July. The little moth, black with two opposite yellow spots on its wings, is very common in most places, and is constantly found in the sweeping-net. When an insect like this, to which several species are closely allied, is so common, it is the cause of great loss to a collector, because, having taken it over and over again, he does not require it, and he is very likely to throw away at times some rarity which closely resembles it. It is long before a collector learns to know with certainty an insect at first sight, and there never was sounder advice than

* Proceedings Ent. Soc., 1852, p. 10.

that given by the late Mr. Ingpen to those who have not had much experience in collecting: * “Never to attempt to decide a species in the fields, but to collect all that are found.”

Broom (*Cytisus scoparius*)—“the lang yellow broom,” of Burns—loves to grow among the sandy soil of heaths. It is a plant beloved for the beauty of its flowers by every man, woman and child, and finds favour in the eyes of insects also, but their “love grows by what it feeds on”—they eat it! In the month of March the approximating shoots may be found firmly bound together half way up, the tips being free; within this fasciculus a larva of *Depressaria assimilella* has lain all winter gnawing the bark of the twigs: in April he will be full-fed, and being only a tenant at will, and that his own, he will then vacate his premises, going on to the surface of the earth to become a pupa, and in June he will be a moth. In June another species of *Depressaria*, viz. *atomella*, succeeds him—that is, the caterpillars then feed on the broom, and may be beaten from it, but I never could find that they draw the twigs together like *assimilella*—they have less occasion to keep themselves warm, and are sheltered by the leaves: the moths come out in August. The larvæ of other small moths, viz. *Gelechia mulinella* and *Coleophora saturatella*, feed upon the leaves, so also probably do those of *Lithocolletis Scopariella* and *Trifurcula immundella*, as the moths have always been found in the bushes. *Cemiosoma Spartifoliella* feeds as larva beneath the bark, coming out and hanging up its long white cocoon in the angle of a bud,

* ‘Instructions for collecting British Insects.’

and appearing in the perfect state all through June and in July. The larvæ of the larger moths, *Hadena Genistæ*, *H. contiguâ* and *Mamestra Pisi* may be beaten from broom, the perfect insects rarely. *Chesias obliquaria* occurs among broom in April and May, and more commonly *C. Spartiata* in October. The flowers are prolific with beetles, and some rarities, among which is *Lebia chlorocephala*, may be beaten out of the bushes: the exceedingly rare *Lebia crux-minor*, I have heard, is taken in company with the last species, on the Continent.

The furze (*Ulex Europæus*), one of the commonest plants on heaths and waste lands in England, enlivening the desolation of the scene for miles with the golden flush of its clustered blossoms, has a few insects specially attached to it; and from the fact that, on account of the low temperature of the North of Europe, this plant is not found there, the insects that are peculiar to it are in some request on the Continent. *Catoptria Ulicetana*, *Depressaria umbellana*, *Coleophora albicosta*, *Butalis grandipennis*, *Anarsia Spartiella* and *Lithocolletis Ulicicolella* are specially attached to this plant, or rather to this and another species, *U. nanus*. The larva of *Gelechia mulinella* feeds on its flowers, but also likes those of the broom. Among the beetles, *Oxystoma Ulicis* feeds on the seeds, and may be beat from the bushes in thousands, and at the same time *Cryptophagus Ulicis*.

Two pretty flowering plants, *Ononis arvensis* and *O. spinosa* (Rest-harrow), that grow on waste lands, are the food-plants of some Lepidoptera. On the former, in May and June, the green larvæ of *Pterophorus Phæodactylus* are common, and

the imago not rare in July. On the latter plant, in July, are the larvæ of *Pterophorus Acanthodactylus*, the perfect insect appearing in August. *Heliothis marginata* is nourished by it, so, if I mistake not, is *Noctua hebraica*, and probably other moths. Zeller gives *Ononis spinosa* as the food-plant of *Gracilaria Ononidis*, but I have taken this species in the hilly field at Headley Lane, and there was no such plant near, nor indeed could I find one within half a mile of the spot; so that some other vegetation probably serves to feed the miner.

The “antique mullein’s flannel leaves,” as Clare calls them, are devoured by the larvæ of *Cucullia Verbasci*, which are very conspicuous by their disparity of colour and marking. Upon being touched they fall off with a jerk, a peculiarity which belongs to all the larvæ of this genus of moths. Another and much rarer species, *C. Lychnitis*, is reared on *Verbascum nigrum*. Several species of beetles of the genera *Cionus* and *Thyamis* are found on the different kinds of mullein, chiefly among the flowers.

Several kinds of caterpillars feed on the leaves of the common dock (*Rumex*), different species of which are so common on every piece of waste ground, and the larvæ of a Dipteron make great disfiguring blotches in the leaves. In a stem, near West Wickham Wood, I once found some Hymenopterous larvæ or pupæ, which I gave to Mr. Smith, and both sexes of *Prosopis cornuta*, a rare bee, came out; so this mere accidental finding on my part produced the happy result of uniting under one name the sexes of an insect hitherto considered and described as of different species. *Rumex acetosa* feeds the larvæ of *Nepticula Acetosæ*. They

mine in a series of concentric circles, which become red, but eventually the regularity is interrupted, and the mine diverges and becomes irregular. The larvæ of *Gelechia diffinis* feed on *Rumex acetosella*, and live in silken galleries, which they spin among the roots close to the surface of the ground.

Thistles and nettles may be looked upon as rival tribes, always struggling for the possession of waste grounds—their prairies: let the quality of the land be what it will, there do these hostile bands crowd in; and, as with men, the poorer the prize the keener is often the contest. The one proceeds both by diplomatic insinuation and by throwing its legions of seeds boldly over the field; the other more slowly, but not less surely, employs, in addition to these means, both sap and mine, and speedily its roots occupy every vantage spot. Insects attend upon both armies as camp-followers. Field-bugs and Aphides crowd upon thistles, the larvæ of *Depressaria Carduella*, *D. subpropinquella*, *Plusia Gamma* and other moths eat the leaves; so also do the larvæ of the Painted Lady butterfly. (*Vanessa Cardui*): among beetles, *Sphæroderma testaceum* and *S. Cardui* show particular attachment; *Agaphantia Cardui* appropriates the stems; and the flowers are the favourite resort of bees, *Bombi* and others, among which *Sphecodes rufescens* has been particularly noticed.

Nettles, abhorred of boys, furnish a living to a great many insects. The larvæ of *Simaëthis Fabriciana* exist in thousands, whence proceed the multitudes of the little merry moths that are seen all through the summer wherever nettles grow. *Botys urticalis* and *B. verticalis* both board and lodge

on nettles. Two of our prettiest butterflies, *Vanessa Io* and *V. Urticæ*, lay their eggs on nettles; the larvæ feed in company, are very conspicuous on account of their spines, and are formidable-looking creatures.

The several species of *Atriplex* and *Chenopodium*, plants which delight to grow in ground recently cultivated, are favourites with the larvæ of several of the larger moths: the larvæ of some of the smaller moths also feed on *Atriplex*, for example, those of *Gelechia næviferella* and *G. Hermannella* mine the leaves in a very similar manner in June and September, but the blotches caused by the former become white, and by the latter dingy green.

Moss, growing on commons or waste ground, particularly on gravelly and limestone soils, is productive, in winter, of several species of the small but singularly-formed beetles, *Pselaphidæ*. The way to procure these and other moss-hiders is to pull up the moss, shake it over a large sheet of paper and take home the shakings, which a collector I know calls "extract," in a tin canister or a bag. You can then examine the extract at your leisure, and secure the small insects which you would not have been able to see out of doors. You will find that, beside or instead of the objects of your search, you have a great variety of insects, which may be killed in hot water and spread out on card at once, or be put into a pill-box and preserved in laurel-leaves for a future opportunity. Mr. Wollaston has given the following directions respecting these matters: *—"When you have leisure to mount a few of them, take a certain number out from the

* 'Entomologist's Annual,' 1855, 2nd edit., p. 107.

bag; and having gummed thickly a space on your card-board equal to, at least, *the entire specimen when expanded*, place the beetle upon it, drag out the limbs with a pin, and, leaving it to dry, go on with the next that presents itself. As the card has to be cut afterwards around your insect (so as to suit it), there is no advantage in gumming it precisely straight upon your frame, though it is true that a certain amount of care in this respect lessens your after labour of cutting off very materially." The composition recommended by Mr. Wollaston for fixing beetles to card is a mixture of three parts gum tragacanth and one part of gum Arabic, both in powder; these are made into a paste just thick enough to run, with water containing a grain of corrosive sublimate: without the latter ingredient it will not keep.

The flower of yarrow (*Achillea millefolia*), another plant fond of waste ground, has for dependants *Eupithecia subfulvata* and *Coleophora argentula*, the larvæ of both moths feeding on the seeds at the same time in the autumn.

The different kinds of hawk-weed (*Hieracium*), that gladden many a sterile spot with their yellow flowers, are favourites with several species of plume moths (*Pterophorus*), or rather with their larvæ. There are also two species of beetles, *Cryptocephalus sericeus* and *C. similis*, both bright, shining green, which are especially attached to the flowers of these plants, where they may be seen in July lurking among the petals. Among bees Mr. Smith records *Andrena fulvescens*, *A. albicrus*, *Panurgus calcaratus* and *Osmia spinulosa* as specially fond of these flowers.

The common rag-wort (*Senecio Jacobæa*), so conspicuous on waste ground by its bright yellow flowers, is, when in bloom,

attractive to *Noctuina*. On the leaves feed the larvæ of the pretty moth *Euchelia Jacobæa*; they are gregarious, and are easily recognized by their alternate transverse bands of brown and yellow.

The common mugwort (*Artemisia vulgaris*), which abounds in sandy soils, feeds several insects. I may mention two: the beautiful Tortrix *Ephippiphora fænella*, the larvæ of which mine the stems, eating down into the root, the perfect insect appearing in July; and *Gracilaria omissella*, one of the Tineina, whose larvæ mine the leaves in July and October, the first brood becoming perfect in August, the second in June the following year. Another moth, *Dicro-rampha caliginosana*, is taken on this plant, but, although it is suspected it feeds thereon, the larva has not yet been detected.

Gravel-pits are not very productive places, but occasionally they reward a search. Sand-pits are much better, for, beside the Fossorial Hymenoptera which burrow in their sides, they entrap many Coleoptera, which fall in and cannot escape. Two or three species of pill-beetles (*Byrrhus*) are almost always among the prisoners, and they afford admirable examples of the faculty possessed by insects generally of shamming dead; indeed so closely do they draw in their limbs, that, until you know the gentlemen, you would never believe the oval mass you hold in your hand is possessed of vitality.

The comparative paucity of insects on heaths, the "botheration" of flies excepted, is compensated by the abundance in such localities, especially in banks, pits and cuttings, of the numerous species of sand-wasps and fossorial bees, the sandy

soil being eminently favourable to the formation of their burrows, in which they breed. Some species are solitary, others live in communities. The larvæ of the sand-wasps feed generally on the larvæ of Lepidoptera and Hemiptera, but, in some cases, on perfect flies, or other insects and spiders deposited for the purpose by the parent wasps, in most instances alive, but sometimes dead. The economy of these insects is truly interesting, and still offers a wide field for research, the labourers therein having hitherto been comparatively few, especially in this country. The standard book on the subject is Shuckard's 'Essay on the Fossorial Hymenoptera.' Mr. Smith's recently published work, before alluded to,* gives us the latest information with respect to the fossorial bees, and from it the following matter is derived. The best localities appear to be Weybridge, Hampstead Heath, Charlton and Cove Common, Hants."

Genus *Colletes*.—"These bees are gregarious, forming large colonies, particularly *C. Daviesana*; and although their numbers are to some extent reduced by the parasites named (*Miltogramma punctata*, a dipterous fly, and *Epeolus variegatus*, a bee, the one feeding upon the larvæ, the other upon the pollen), still their destruction by these means sinks into insignificance when compared to the wholesale slaughter committed upon them by *Forficulæ* (earwigs): these omnivorous enemies devour indiscriminately pupæ, larvæ or pollen; and in some situations they abound to such an extent, that not less than three-fourths of the bees perish through the attacks of these destructive insects."

* 'Catalogue of the Bees of Great Britain.'

Genus *Halictus*.—"The economy of this genus of Andrenidæ does not appear to have been ascertained previous to my own observations being published in the year 1850: it is so remarkably different to that of all other solitary bees, except of those belonging to the genus *Sphecodes*, that I am surprised it had escaped the researches of my predecessors, who, like myself, 'have loved to hear the wild bee's hum.' It will be observed that the females of *Halictus* and *Sphecodes* make their appearance in June, and are to be found from that time until late in autumn; but no males of these genera will be observed until long after the appearance of the females: my observations on a colony of *H. morio* will serve as the history of the whole genus, making allowance for the different periods of their appearance. 'Early in April the females appeared, and continued in numbers up to the end of June; not a single male was to be found at any time; during the month of July scarcely an individual could be found; a solitary female now and then might be seen, but the spring bees had almost disappeared; about the middle of August the males began to come forth, and by the end of the month abounded; the females succeeded the males in their appearance about ten or twelve days: these industrious creatures began the tasks assigned to them, burrowing and forming their nests; one of their little tunnels had usually others running into it, so that a single common entrance served as a passage to several cells, in each of which a little ball of pollen was formed and a single egg deposited thereon; the larvæ were usually ten or twelve days consuming it, by which time they were fully fed; in

this state they lay until they changed to the pupa-state, when they very shortly became matured.' I have reared individuals of *H. rubicundus* from the egg to the perfect insect; on the 15th of July I procured cells containing the pollen-balls with an egg on each; in twelve days the larvæ were full-fed; the change to the pupa-state took place about the 25th of August, and during the first week of September the perfect state was acquired. The history of *Halictus*, therefore, is as follows. the males and females appear in the autumn: the latter being impregnated pass the winter in the perfect state, appearing during the following season to perform their economy, as detailed above in the case of *H. morio*. This is the result of my present observations, and I believe it to be the true history of *Halictus* as well as of *Sphecodes*. Humble-bees and wasps pass the winter months in a torpid state, having been impregnated during the previous autumn, but amongst solitary bees I know no other genera besides *Halictus* and *Sphecodes* which resemble them in this respect."

Genus *Andrena*.—"This genus is by far the most numerous in species of all the genera of bees found in this country; we have about seventy known species, and when the northern parts of the country are assiduously searched no doubt many more will be added. These bees are all burrowers in the ground, some species preferring banks of light earth, others hard trodden pathways, &c.; their burrows differ in depth, but are seldom less than about six, whilst others excavate to nine or ten inches; at the bottom of each burrow is formed a small oval cell or chamber, in which the industrious female lays up a small

pellet of pollen mixed with honey; these little balls are usually about the size of a garden-pea, varying somewhat in size in different species. Sometimes, apparently to economise time, the bee constructs branch tunnels, each having a similar chamber at its extremity: this peculiarity I have observed in *A. rubricata* and *A. fulvescens*; it is also probably not unusual with many other species: when she has completed her task she closes the mouth of the tunnel.

“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 should 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 until 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 connection between certain species exists, and I have never met with some species of these parasites, except in connection with certain species of *Andrena*; but there are others which infest the nests of several species of *Andrena* indiscriminately. Much further investigation is still necessary before we can arrive at a knowledge of the real nature of the connection 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 to perish; 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 amongst the Heteromorous 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 of diminutive 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 five or six inches square, cover it with gauze, and supply the bee with fresh flowers, such as the *Andrenæ* 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 their 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 ever 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 *Meloe*: 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 *Meloe 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 *Meloe*; 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 that 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 *Meloe*, 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 *Meloe*. I have found them on various species of bees, usually on those which are most pubescent, as *Andrena fulva*, *thoracica* and *nigro-ænea*; also commonly on *Melecta armata*, *Anthophora retusa* and *pilipes*: this circumstance would appear to confirm or indicate a connection 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 *Meloe 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 *Meloe*, 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 that the larva of *Meloe* 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 the *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.”

Genus *Osmia*.—“ If I were asked which genus of bees would afford the most abundant materials for an essay on the diversity of instinct, I should without hesitation point out the genus *Osmia*. The most abundant species is *O. bicornis*; its economy is varied by circumstances; in hilly country or at the sea-side it chooses the sunny side of cliffs or sandy banks in which to form its burrows;

but in cultivated districts, particularly if the soil be clayey, it selects a decaying tree, preferring the stump of an old willow. *O. leucomelana* may be observed availing itself of a most admirable, and almost ready, adaptation for a burrow; it selects the dead branches of the common bramble. *Osmia hirta* burrows in wood, seldom in any other material; the same habit will be observed in *O. ænea*; but I have observed this bee more than once constructing its burrow, in the mortar of walls, and sometimes in hard sand-banks. *O. aurulenta* and *O. bicolor* are bees which commonly burrow in banks, but although it appears to be the natural habit of these bees to construct tunnels in hard banks, with great labour and untiring perseverance, still we find them at times exhibiting an amount of sagacity, and a degree of knowledge, that at once dispels the idea of their actions being the result of a mere blind instinct, impelling them in one undeviating course. A moment's consideration will suffice to call to mind many tunnels and tubes ready-formed, which would appear to be admirably adapted for the purposes of the bee—for instance, the straws of a thatch and many reeds; and what could be more admirably adapted to their requirements than the tubes of many shells? So thinks the bee! *O. aurulenta* and *O. bicolor* both select the shells of *Helix hortensis* and *H. nemoralis*: the shells of these snails are of course very abundant, and lie half-hidden beneath grass, mosses and plants; the bees finding them in such situations, dispense with their accustomed labour and take possession of the deserted shells. The number of cells varies according to the length of the whorl of the shell selected, the usual number being four, but in

some instances they construct five or six, commencing at the end of the whorl; a suitable supply of pollen and honey is collected, an egg deposited, and a partition formed of abraded vegetable matter; the process is repeated until the requisite number is formed, when the whole is most carefully protected by closing up the entrance with small pellets of clay, sticks and pebbles; these are firmly cemented together with some glutinous matter, and the bee has finished her task.

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

Genus *Anthophora*.—“ *A. furcata* is a wood-burrower, the rest of the indigenous species burrow in the ground or in walls and similar situations; *A. acervorum* is sometimes seen in great numbers perforating the mortar of barns and outhouses; its more constant habit is to burrow in banks. They are subject to the attacks of various parasites and other destroyers; of the latter kind nothing can surpass the wholesale slaughter committed on their broods by the common earwig: this destructive insect penetrates their burrows and

devours the food laid up for the progeny of the bee, and there is reason to believe that they also destroy the pupæ; they appear to be omnivorous, and to devour alike pollen, honey, pupæ and perfect insects."

"Of the insects which are parasitic on *A. acervorum* in the larva state, the first which claims notice is a species belonging to the Chalcididæ, of the genus *Melittobia* of Westwood, with which the genus *Anthophorabia* of Newport is synonymous. The latter gentleman published a valuable and highly interesting memoir on this parasite in the Linnean 'Transactions,' vol. xxi., p. 63.

"In the autumn of 1853 I had the pleasure of finding this interesting parasite in the cells of *Anthophora*. The female is a minute, shining, dark green insect, not more than half a line in length; the male is equally minute, but is of a testaceous-yellow colour, having only rudimentary wings, and is not furnished with the usual compound eyes, but has in their place exceedingly minute simple eyes or ocelli, besides three true ocelli on the vertex of the head: this remarkable conformation was discovered by Mr. Newport, who has given ample details and the results of most elaborate physiological investigations, in the paper alluded to. *Melittobia* is here treated as the parasite of *Anthophora*, in accordance with the history of its habits as detailed by Mr. Newport; but when I discovered the larva it was feeding on that of *Monodontomerus nitidus*, a true parasite on the bee, which has been found in its cells feeding on the pupæ. Having obtained a large supply of larvæ of the bee, and also of *Monodontomerus* and *Melittobia*, ample means of observation were afforded, the result of which appeared to show that *Monodontomerus*

is the true parasite of *Anthophora*, and *Melittobia* a parasite of both genera. * * * * The mode of attack which these parasites practise appears to be made by several females obtaining entrance to the cell of the bee and attacking its larvæ, upon which they deposit their eggs, to the number of one hundred at least, which soon hatch, and the young larvæ attach themselves to their victim, continuing to feed until full-grown, when they fall off and lie inactive at the bottom of the cell; by the time the whole brood is full-fed, the larva of the bee is entirely consumed. The bees and their parasites appear in their perfect condition about the same time in the season, some having passed the winter months in the larva state, others in their perfect condition.

“Two bees are parasites upon the genus *Anthophora*—*Melecta luctuosa* and *M. armata*; the former upon *A. retusa* and the latter upon *A. acervorum*: the latter makes its appearance very early in the spring, as soon, in fact, as the first wild-flowers bloom; it may be sometimes observed early in March, attracted by the garden crocus; it continues to be found as late as July, and was captured in the Isle of Wight on the 15th of that month. The latter circumstance is explained by an investigation of a large colony in the month of November, when a large portion of the brood will be found to have arrived at its perfect condition, the rest being in the larva or pupa state, the latter fast advancing to maturity; the entire brood of the colony will pass the ensuing winter either as larvæ or perfect insects; none can withstand its rigour in the intermediate or pupa state. Those which remain larvæ until the spring advance to the perfect state very irregularly; many will not become perfect until May, and a few probably

not until June: this will account for the species being found during so many months in one season. I have frequently had larvæ in an artificial position, that is, in glass tubes or boxes, which have not changed until the second season, but am quite unable to account for such an apparent anomaly; how little, in fact, is at present known of the *complete history of the Aculeate Hymenoptera!* for, to use the words of Kirby, ‘So much knowledge, even with respect to a single genus, where the species are numerous, is not to be expected from one man.’ But if each Hymenopterist would give faithful records of his observations, the day will come when by a combination of observations, an approach will be made towards a perfect knowledge of the history, economy and uses of each individual species.”

For thus transferring to these pages so long an extract from Mr. Smith’s book, it may be thought that I ought to apologise,—not to my readers, for I could not have written anything half so good,—but to Mr. Smith: I believe, however, that in placing his words before a circle of readers that would otherwise never have seen them, I am helping to increase the number of Hymenopterists who will assist in making the observations and the records thereof, above indicated, and am serving both Mr. Smith and Science: and so, without any apology, I tender my thanks for these and the other histories in the ‘List of the Bees of Great Britain.’

§ VIII.

THE DOWNS.

“The downs,
In clearest air ascending, show'd far off
A surface dappled o'er with shadows flung
From brooding clouds; shadows that lay in spots
Determined and unmoved, with steady beams
Of bright and pleasant sunshine interposed;
Pleasant to him who on the soft cool moss
Extends his careless limbs.”

WORDSWORTH.

UNDER the head of “Downs,” I wish to include not only the tracts of country properly so called, but the chalk or limestone districts of the South and West of England, for the plants which grow wild on such soils are not confined to the downs, and the insects which feed on them are distributed, more or less, throughout the range of the formation, from Dover to Bristol. There are many insects seen on the chalk that are common on other soils, but I shall in general confine my attention to such as are peculiar thereto, or occur in unusual abundance. The downs most frequented by the London entomologists are Sanderstead, Riddlesdown and

Stoat's Nest, beyond Croydon, Mickleham Downs and the adjacent hills extending from Dorking to Reigate.

It is when visiting such localities that the entomologist finds how great an assistance railways are to him, giving him a help that the old race of collectors never possessed nor dreamed of. Half their time was taken up in getting to and from a locality; now their successors may, if they please, be set down at the scene of their labours by breakfast-time. All this seems common-place enough; similar advantages are enjoyed in business and pleasure by every one; nevertheless it makes a deal of difference in the result of a day's collecting whether the collector arrive on the ground fresh or tired; to say nothing of the greater amount of time at his disposal. The downs are a dry and thirsty land, where no water is: it is no joke to work hard all day without anything to drink: your only chance of a draught is to carry it with you, unless you happen to stumble on one of the cottages to be found here and there. As for eatables, my advice is to take them also with you in a tin, which, when emptied, will serve for keeping larvæ in, or for other entomological purposes. It is, I think, far better to dine under a hedge than to walk two or three miles in the heat, and as many back again, after eating a dinner which will render you unwilling, if not unable, to go on with your collecting; and, besides, you gain the time.

“What more felicitie can fall to creature
Than to enjoy delight with libertie?”

said old Spenser: to *this* delight may be added, a companion of open heart and gentle manners, quick at a capture

and ready at a repartee; and if, in addition, he be possessed of

“the vision and the faculty divine,”

I know no greater enjoyment than to spend a day in such company. Then we

“feel how the best charms of Nature improve
When we see them reflected by looks that we love.”

In the ‘Zoologist’ I published a series of papers on “Entomological Localities,” in one of which, under the head of “The Downs,” of those beyond Croydon I wrote as follows: — “The whole district was in former times covered with dense woods of beech and oak, of which but small portions now remain, such as the Purley oaks and the few old beech trees on Sanderstead Downs. Many portions are cultivated, and the rest, scattered over with hedge-rows, thickets of thorn and hazel, bushes of juniper and furze, affords fine pasturage for sheep and ‘such small deer’ as the entomologist loves to hunt. How long it may be ere we shall have these hunting-grounds swept from us by the advancing tide of cultivation, as the forests and prairies of North America were wrested from the red Indians, I know not; but I see an inroad has lately been made at Stoa’s Nest, where many acres of surface have been ploughed up and burnt. Unfortunately, for us there remains no ‘far West;’ and when these and other haunts have been over-run by the ‘Pale faces’ of cultivation, we, or it may be another generation of naturalists, shall look upon British specimens of

many now common insects with some such feelings as those with which we view the remains of the Mammoths or Megatherium. I do not think this is any exaggeration, for, in many localities, Whittlesea Mere for instance, in consequence of the altered conditions induced by cultivation, many species of insects are altogether lost or become very rare. A considerable expanse of open country, however, still remains here, and will well repay an entomological search." *

Since these remarks were published, Mr. T. V. Wollaston, an entomologist whose opinion on such a matter is entitled to great respect, has written thus:—"It is a mistake to suppose that the progress of agriculture tends to lay waste our entomological preserves, and to exterminate insect-life. In some few instances (as in the destruction of forests) this may be, and probably is, the case; but I am convinced that in a general way the very reverse is nearer the truth. The vast superiority of the London district, highly cultivated as it is, over almost every other in England, may be quoted in support of this; and I may add, from personal observation, that I never met with such marked success as along railway embankments, and on other grounds recently turned up by the edges of gardens and fields, where the vegetation is rank and redundant. Let not the collector assume, therefore, that he must needs sally to a distance for his game, since he will often reap a richer harvest a hundred yards from his own door than by taking a 'return ticket' (which involves, moreover the loss of time) for a hundred miles into the country—

* 'Zoologist,' 1852, p. 3430.

perchance into some cold clayey region where his exertions will prove comparatively fruitless.”*

In so far as the above tends to impress upon collectors the advantages to be derived from searching well their own districts, I heartily concur; but I cannot agree with the learned author in thinking that the progress of agriculture does not tend “to lay waste our entomological preserves and to exterminate insect-life.” Why, on the very ground at Stoa’s Nest of which I have spoken, I used to take several Lepidoptera which have quite disappeared since the cultivation began, and although the number of insects absolutely is probably as great or greater than it was before, what is that to the collector? There is not one of them that he could not get in any field; and thus he is by this cultivation so much the poorer. Carry out the same principle; cultivate all the waste lands, and what will become of the insects inhabiting them? The edges of cultivated ground may still harbour some of the aboriginal inhabitants; but, confined to such narrow limits, they will gradually become less numerous and eventually extinct. Whittlesea Mere is another case in point; but I think I need adduce no further instances. I may, however, quote the opinions of two of our best known collectors in support of my views. The Rev. J. F. Dawson says, “When we read of the reputed productions of Devonshire, for instance, we naturally demand to know whether cultivation, that greatest foe to the entomologist, has so entirely changed the character of that country (so favourable to the development of insects) that it no longer produces

* ‘The Entomologist’s Annual,’ 1855, 2nd edit., p. 102.

such much-prized rarities as *Carabus intricatus* and *Diachromus Germanus*. We should be unwilling to admit it without a more careful and systematic investigation, though we well know that in many other parts of England (especially in the fen districts), the advance of extensive drainages and cultivation has most assuredly had the effect of entirely banishing those entomological productions which formerly abounded in such localities.* Mr. F. Smith, writing of *Prosopis punctulatissima*, says, "Only once met with, on a collecting excursion at Birch Wood, Kent; which, about the years 1839-40, was an excellent locality for many Hymenopterous insects, particularly that side which faces the west; but all the old uncultivated land is planted, and many species are not now to be met with."† "The superiority of the London district, highly cultivated as it is, over almost every other in England," referred to by Mr. Wollaston in support of his theory, is not disputed, but it is due, I think, to anything rather than to the cultivation. It is, I believe, more in consequence of the diversity of soil and corresponding variety of the *uncultivated* plants within its limits, aided, to some extent, by the number of different trees and plants in the suburban gardens. It will no doubt be said that "he who can make two ears of corn grow where only one grew before," or he who can make any corn grow where none grew before, is a benefactor to his race, and that we ought not to put Entomology in the scale against Agriculture: this is no doubt true, and I have no wish to argue the question; but it is not the point at issue.

* 'The Entomologist's Annual,' 1856, p. 66.

† 'Catalogue of the Bees of Great Britain,' p. 12.

The surface of the downs generally, so delightfully green and soft, affords to the collector many insects, without much trouble. Of the butterflies, *Colias Edusa*, and more rarely *C. Hyale*, are seen in August and September. Of my first experience of the latter insect I have thus written :—"Just through Croydon the embankment of the old tramway runs parallel and close to the turnpike-road; it is a capital place for many insects. One of my earliest expeditions to this place was in 1842, with Mr. Lambert, who was one of my instructors in collecting; and I shall never forget his excitement, when, as we were going leisurely along near the Purley oaks, on a broiling afternoon in August, a *Colias Hyale* came dashing along, settled for an instant on a flower, and, as if sunshine were too precious for it to waste, rushed on again. 'By Jove!' said Lambert, 'it's ——.' He could say no more, nor did he stay to remember the name, but, with hat off, coat flying and net extended, I saw him coursing like mad up the hill. After awhile he returned flushed with victory and heat, and told me what a prize he had: in a short time we had captured several of this rare butterfly, and added a chapter to the 'Diversions of Purley,' not to be found in Horne Tooke's book."* In this same year this butterfly was common all over the South of England, but since that time it has occurred but occasionally and in places far apart. There used to be a theory that it appeared in abundance once in seven years, but experience has not proved this to be true.

Arge Galathea, the Marbled-White butterfly, is somewhat

* 'The Zoologist,' 1852, p. 3431.

local, but abounds in July in several places, about Dover Heights for example, where also, at the same time, *Argynnis Aglaia* occurs; and in August *A. Lathonia*, or Queen of Spain, and *Mancipium Daplidice*, or Bath White, our two rarest butterflies, have two or three times been captured. In July, *Satyrus Semele*, accompanied the blue butterflies *Polyommatus Adonis*, or Dartford Blue, *P. Corydon*, the Chalk-hill Blue, *P. Agestis*, or Blue Argus, and *Pamphila Comma*, are common. *P. Alsus*, or Bedford Blue, is also found on the downs in hollow or sheltered places among long grass: in a field of this kind at Mickleham it abounds, and as you walk through the grass after it *Euthemonia russula* gets up frequently, in a hurry to be out of your way: when you have marked one down, and leave your first game to go after it, not infrequently the moth *Toxocampa pastinum* flutters out in a bustle, and distracts your attention. On the downs at Lewes, in June, occurs the beautiful green *Ino Globulariæ*; "it is gregarious, but extremely local, so much so, indeed, that the most careful entomologist might search the downs for days without seeing it, although at the time of its appearance."* An allied species, *Ino Statices*, occurs in several places about the same time, but it has blunt antennæ, whereas in *I. Globulariæ* these organs are pointed. A rare moth, *Agrotis cinerea*, has also been captured on the Lewes downs, in June, by sugar at night, and by searching closely over the grass in the day-time. On dry banks, such as that in Headley Lane, several kinds of *Pyrausta* flutter and settle incessantly in the sunshine; and such pretty creatures as

* Mr. J. Jenner Weir, in the 'Zoologist,' 1845, p. 1085.

Dosithea ornata and *Aspilates gilvaria* continually fly up and arrest your attention.

Walk over the downs in July, in the day-time, and you will scarcely see one small moth: walk over the same ground in the evening and you will see thousands. The most common will probably be *Phoxopteryx comptana* and *Eriop-sela fractifasciana*, always excepting *Gelechia terrella*, which comes out in thousands.

Beating the hedges will always reward you with something good. *Harpalyce Galiata*, *Anticlea rubidata*, *A. sinuata*, *Eupithecia Satyrata*, *E. piperata*, *Phibalapteryx Vitalbata*, *Scotosia Rhamnata*, and many other fine Geometrina will rush out and tax your dexterity. From the buckthorn, in July, you may beat the rare *Eupæcilia sodaliana*, *Laverna Rhamniella* and *Bucculatrix Frangutella*. The larvæ of the latter feeds on the leaves, those of the other two are also believed to live on the trees, but they have not yet been discovered; they probably attack the seeds or mine in the wood.

On Mickleham Downs, one of our scarcest moths, *Pachetra leucophæa*, which was long doubted to be a native species, has been captured in June, at night, with sugar put on the trunks of the trees. Other species, some not very common, have been taken at the same time. In September and October, *Xanthia citrago*, *Calocampa exoleta* and *C. vetusta*, *Xylina semibrunnea* and *X. rhizolitha*, *Dasycampa rubiginea*, and other moths less rare, have been attracted to the sugar bait placed on the trunks of trees in this locality.

From the fir trees on Mickleham Downs, in July, I have

beat out the fine moth *Boarmia Abietaria*, the larvæ of which feed on the Scotch fir; also, at different periods, the following small moths, whose larvæ are all pine-feeders, namely, *Gelechia dodecella*, *Coleophora Laricella*, *Ocneros-toma Piniariella* and *Cosmopteryx Pinicolella*.

The juniper bushes, which are scattered all over the downs, produce some specialities. Five species of *Argyresthia* succeed each other thereon during the summer, from May to August. In July, *Cochylis rutilana*, a pretty red and yellow Tortrix, is common, especially at Stoa's Nest; also *Ypsolophus marginellus*, with narrow parallel wings, brown margined with white: the larva of the former feeds, I suspect, on the fruit of the junipers; the latter, we know, eats the foliage, and spins, when full-fed, a loose flossy nest, in which it changes to pupa. In October, and far into November, *Thera Juniperata* appears on the juniper bushes: in the day-time you may beat and search in vain, but take a lantern at night, and if the weather be cold you will find the moths sitting in the midst of the bushes; if the temperature be warm, you will see them on the outside or flying about. Until the habits of the moth were discovered, specimens were very rare, but now there is not a collection without examples. *Sophronia parenthesella*, a little brown moth, related to *Ypsolophus marginellus*, but of a darker brown, and with only a dash of white, like an epaulette, on its shoulders, occurs among the junipers, but I doubt if it is in any way connected with them, for it is found in other places where there is not a juniper bush. A large Hemipterous insect, *Pentatoma Juniperana*, and a smaller but prettier species, *Acanthosoma pictipenne*, live on junipers.

At the top of Mickleham Downs is the ground so well known to collectors as "the Hilly Field," throughout the summer the very Arcadia of insects of all sorts. You cannot set foot into it in the day-time without starting something, and towards sunset the amount of insect-life that becomes active is astounding and quite perplexing. If you stand still you do not know what to take first; if you sweep up a lot with your net, there are so many prizes flying and creeping up its sides that you do not know which to select. Of the beautiful metallic *Adelæ*, or long-horned moths, two species, *Nemotois minimellus* and *N. cupriacellus*, occur. The latter species has the singular fact pertaining to its history that the male is not known, only females having ever been captured. It only wants for these insects to be pugnacious creatures to establish them as the Amazons of the insect-world: as with their prototypes, though they seem to do without the fellowship of males, the race is continued: can it be that only a minimum of the male offspring is reared? The natural history of all the species is involved in obscurity and affords a very interesting problem for solution. Mr. Ashworth has recently recorded of *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."* I think, nevertheless, that this repeated observation of a circumstance in the natural history of the insect may, if followed up, give us a clue to the food and habits of

* 'The Zoologist,' 1855, p. 4814.

the larvæ of the family, about which nothing is known, except that the larvæ of *Adela Degeerella* are reputed to be case-bearers feeding on several herbaceous plants. May it not be that all the species of the family have a like habit, and are to be found, not, as might be supposed from the observations of Mr. Stainton and Mr. Ashworth, on the flower, but on the leaves of the food-plants. We know that in the instance of *Lampronia prælutella* the case-bearing larvæ attach themselves closely to the under side of the leaves, quite out of sight, and those of the *Adela* may have a similar economy.

I cannot pretend, for want of space, to enumerate the Tineina that have been taken in the Hilly Field. There are a few, however, that I cannot pass over. If you collect the dry flower-heads of the wild marjoram (*Origanum vulgare*) in the spring, and put them into a box in-doors, you will soon see what appear to be some of the dry calyces of the flowers separated from the mass, and walking about. Each of these contains a living larva of *Gelechia subocellea*, which has made itself in the previous autumn a portable dwelling out of two or three of the flowers, in which it will remain until the following July, when the perfect moth will emerge. In their habitat among the dry florets these cases can scarcely be distinguished from them. The larvæ probably feed upon the seeds. At the same time that you gather these flower-heads you may pick at random a lot of those of the black knapweed (*Centaurea nigra*), a plant which abounds here: some of them will be sure to contain the larvæ of *Parasia Metzneriella*, and will render you the moth in July. An allied species, *P. neuropterella*, is occasionally taken in the field:

the larvæ are surmised to have a similar habit to the last in the receptacles of the stalkless thistle (*Cnicus acaulis*). The larvæ of *Depressaria nanella* feed in May under the upper surface of the leaves of the carline thistle (*Carlina vulgaris*): those of *D. Douglasella* were found by Mr. Boyd on an Umbelliferous plant in Headley Lane, and in the same place I found one of *D. Capreolella* on the radical leaves of *Pimpinella saxifraga*, one of the Umbelliferæ. *Gracilaria Ononidis* I have taken in the field by sweeping, and *G. semifascia* is abundant in September in the yew trees adjoining Headley Lane: the larva of the latter moth is yet unknown. In this lane also *Butalis fusco-ænea*, a rarity, has recently occurred in some numbers.

Among the Tortricina taken in the field I may mention *Semasia rufillana*, *Ephippiphora trigeminana*, *Sericoris conchana*, *Catoptria cæcimakulana*, and in the lane *Dicro-rampa consortana*. From the seeds of the primroses growing here I have reared *Eupacilia ruficiliana*, though I never captured the perfect insect. From the neighbouring beech trees I have beaten *Stigmonota Weirana*.

Among the Pyralidæ we get *Pempelia carnella*, whose beautifully tinted red and yellow wings delight every collector; *P. dilutella* and the rarer *P. ornatella*, *Hypochalcea ahenella*, *Cledeobia angustalis* and *Botys hyalinis*.

In other similar districts we have some special species; thus near Bristol is found *Eupacilia dubitana*, in hedges at Sanderstead *Pacilochroma signatana*, near Lewes *Tortrix dumetana*, and Mr. Stevens has recorded that "he obtained the larvæ of *Cucullia Lychnitis* from off the leaves and

flowers of the mullein found in a chalk-pit at Arundel, in Sussex."*

Before I leave this Hilly Field, so enchanting to the entomologist, I must notice a few of the Coleoptera found therein. One of the most interesting is *Claviger foveolatus*, the accidental discovery of which here in 1843 was the means of drawing attention to this rich locality. Mr. F. Smith thus writes:—"I have been an examiner of ants' nests, and an observer of their habits for some years, and have searched in scores of the nests of *Formica flava* for the *Claviger*, and this perhaps is the reason why I have not found it. In the immediate neighbourhood of London there are no stony fields like those in chalky districts, such as Mickleham, &c.; and where the soil is subject to the retaining a greater degree of moisture, like the London clay, the ant appears to find it necessary to raise up a hillock like a mole-hill, to the upper chambers of which she conveys her larvæ, eggs and pupæ, as the atmospheric changes render it necessary; but, on the contrary, at Mickleham I did not observe a single instance of any superstructure being raised, for, in a soil so light as in some places barely to cover the strata of chalk, the ant is glad to find a situation so suited to her purpose as the under side of a large stone, for here the necessary degree of moisture for the development of her progeny is retained in the earth. Now it will be obvious that the difficulty of detecting the *Claviger* amongst the accumulations of the ant-hill must be very great, but on removing the stones you are at once, as it were, admitted into the channels of the nest, filled with eggs, larvæ

* 'The Zoologist,' 1845, p. 1142.

and pupæ, and amongst these it is that the *Claviger* is found.

“The first question which naturally arises is this—what is the nature of the connection between the two insects? P. W. J. Müller, in Germar’s ‘Magazin der Entomologie,’ informs us that the ants altogether support the *Clavigers*, for the sake of a peculiar secretion which exudes from them, and which the ants suck from the two flocks of hair that terminate the external angles of the elytra,—that the ants occasionally caress the *Clavigers*, who then give out a fresh supply of the fluid,—that the *Claviger* is wholly dependant for support on the ants, who feed it with juices extracted from flowers, &c.

“It is but reasonable to suppose that, as the *Claviger* is destitute of eyes, it would never of its own accord quit the nest; and I think the mode in which it becomes distributed will be best shown by what I shall relate of my own observations on another parasite or inhabitant of ants’ nests. It must not be supposed, from what I have stated, that every nest contains *Clavigers*: that I am convinced is not the case, even in the neighbourhood where it has been found; nor can it therefore be absolutely necessary to the ants or their economy, any more than a species of *Aphis* which I found numerous in some nests, while in others I observed a *Staphylinus* (*Astilbus canaliculatus*), and the first capture which I made in the ants’ nests at Mickleham, and supposed to be a *Claviger*, I found on examination was a species of *Euplectus*, apparently undescribed: from the two latter insects the ants probably procure no exudation, but they are notorious for obtaining it from the different species of *Aphis*.

From another insect, the *Atemeles acuminatus*, I have no doubt a similar fluid is obtained by more than one species of ant. Some years ago I was watching the proceedings of a colony of the *Formica rufa*, or wood ant, and on scattering a small portion of the nest down a sloping bank I observed a specimen of *Atemeles* amongst the ants, running quickly about until seized by one of them: I searched in vain for more; but in the nest of *Formica fusca* I have frequently found them, and two years ago, whilst attentively watching the proceedings of that species, about the first week in May, just when the young larvæ are found, I observed an ant carrying an *Atemeles* in its mouth towards the nest; I searched further, and detected twelve or fourteen ants thus employed, and I found them very reluctant to part with their burdens: the *Atemeles*, like the *Claviger*, is furnished with tufts of hairs, but they are situated on the lateral margins of the first three or four segments of the abdomen; there are also two processes flocked with hair on the ventral segments; this is perhaps an adaptation to the same purpose, as mentioned by Müller with regard to *Claviger*: in the *Astilbus canaliculatus* before mentioned the tufts are wanting, still the same end may possibly be attained by another means.

“ The affection of the ants for these little creatures is very great; for on removing a large stone from a nest of *F. flava*, full of eggs, larvæ and pupæ, I immediately observed several specimens of *Claviger*, one pair *in copulâ*, others crawling sluggishly amongst the larvæ, &c., the ants apparently taking no heed of them: I placed one on the turned-up stone, on which several ants were running; it was instantly seized and

carried to the nest: I have tried the same experiment with *Atemeles*, with the same result, but I have also seen the *Atemeles* attempt to escape from the nest, pursued and taken back; this, from its blind and sluggish motions, I should expect, is never the case with *Claviger*. I am inclined to the opinion that the only purpose for which these insects are retained by the ants is for the sake of the fluid which they extract from them: I feel convinced that there are hundreds of nests without them: they are most numerous during the early summer months, whilst the larvæ are in the nests, and I was at one time inclined, from that circumstance, to think that the fluid extracted from them might serve to nurture particular sexes of ants, but the fact of their not inhabiting every nest at once decides the question.”*

The number of species of beetles found throughout the Mickleham district is very considerable. Several rarities among the Geodephaga are to be met with under stones, especially on Box Hill, in the spring and autumn; and on Buckland Hill, towards Reigate, *Callistus lunatus*, perhaps the prettiest of our ground-beetles, and *Lebia cyanocephala* sometimes occur in profusion. Once on the slope of Mickleham Downs, above the village, I took a single specimen of that rarity *Panagæus quadripustulatus*. On the flowers of *Hieracium*, *Cryptocephalus sericeus* and *similis* are not rare; and *C. lineola*, *C. Moræi* and *bilineatus* are occasionally taken. On the flowers of *Helianthemum vulgare*, in June and July, *Bruchus Cisti* is commonly seen very active in the hot sunshine, taking wing on the least alarm. In

* ‘The Zoologist,’ 1843, p. 267.

the flowers of *Campanula rotundifolia* is found one of the Curculionidæ, *Miarus Campanulæ*, and in the flowers of *Campanula glomerata*, *Miarus Graminis*. There are hosts of other good things on chalk soils to reward the collector, which, for want of space, I must pass over; but I may mention that on the palings opposite the Running Horses, in the village of Mickleham, you may find, in the month of June, a curious "humpty-dumpty beetle," as one of my children called it, *Ptinus Lichenum*, and after you have taken it the best thing you can do is to adjourn to the inn over the way, where the worthy hostess is accustomed to entomologists with extraordinary appetites, and serves them literally "on the shortest notice."

§ IX.

THE WOODS.

“ The wood,
The covert of old trees with trunks all hoar,
But light leaves young as joy. * * * * *
A populous solitude of bees and birds,
And fairy-form'd and many-coloured things.”

BYRON.

I HAVE shown how many insects may be found in several localities; now I have to say a little about woods, which form the chief resorts and hunting-grounds of the entomologists. Crabbe has a few lines in point:

“ There is my friend the Weaver; strong desires
Reign in his breast; 'tis beauty he admires :
See! to the shady grove he wings his way,
And feels in hope the rapture of the day—
Eager he looks; and soon, to glad his eyes,
From the sweet bower, by Nature form'd, arise
Bright troops of virgin moths and fresh-born butterflies;
Who broke that morning from their half year's sleep,
To fly o'er flowers where they were wont to creep.

“ Above the sovereign oak, a sovereign skims,
 The *purple emp'ror*, strong in wing and limbs :
 There fair *Camilla* takes her flight serene,
Adonis blue,* and *Paphia* silver-queen ;
 With every filmy fly from mead or bower,
 And hungry *Sphinx* who threads the honey'd flower ;

* * * * *

He fears no bailiff's wrath, no baron's blame,
 His is untax'd and undisputed game.” †

I wish our game was undisputed : the Chancellor of the Exchequer has not yet laid his hand upon it, and so it is “untaxed ;” yet one cannot enter a wood anywhere without fear of being as unceremoniously dealt with as a felon. One example may suffice, namely, Coombe Wood, formerly one of the great localities for insects of all kinds, to which the London collectors resorted. Now, and for some years past, alas ! this fine wood is sacred to game, under the protection of a Royal Duke, and a collector dare no more set foot within its hallowed precincts than a poacher ; in fact, I am not sure, judging from the usage I and others have experienced when accosted by the guardians of this place, on what *was* a public road right through the wood, but that a poacher would be more leniently dealt with than an entomologist. A keeper cannot believe that a man would go about in search of insects only ; he thinks that an insect-net is only a blind for attacks upon the nests of pheasants, and

* This is an error : *Adonis* frequents open ground only.

† ‘The Borough.’

has a strong suspicion that beneath the pill-boxes in your coat-pocket you have a gin for a hare. I confess it is with no pleasant feeling that I see "Coombe Wood" in the pages of Haworth and Stephens, as the locality of many insects, still rare or not to be found elsewhere, although so many other places for collecting have been frequented since the time of those authors; and now I cannot look at the place from any side, but a notice that "Trespassers will be prosecuted" is thrust before me.

It may be necessary to impose some restraint upon general admission to woods, but surely there is no occasion for the owners to be so penurious of their acres to all. As an exception, it gives me great pleasure to mention Robert Harvey, Esq., the owner of Black Park, Bucks, a gentleman to whom the thanks of entomologists are due for the liberality with which, upon application, he grants permission to frequent his fine woods.

But, proceeding upon the supposition that you have arrived at a wood, I may say, before you enter it, that the outside is, in some respects, better than the inside. Many insects are to be found there by beating and sweeping, that, if they live at all within the cover, cannot be reached. It is only recently that a moth, new to Britain, *Lithocolletis Bremiella*, was discovered in the larva state, feeding in the leaves of *Vicia sepium*, growing at the margin of a wood near Bexley, Kent, and we are informed by the first finders of the species in Germany that it is only when the food-plant grows at the edges of woods that these larvæ are found on it. The next best places are the paths through the wood, not narrow ones through the thick bushes, but those that are broad and

open. It is in such places that you see the butterflies frequenting woods; such as *Nemeobius Lucina*, or Duke of Burgundy, skipping merrily over the top of the underwood in May; *Argynnis Paphia*, strong of wing, floating along before you in all the pride of beauty, stopping for a moment to refresh itself with a sip of honey in the cup of a bramble-flower, and then going off again like an arrow; or *Limenitis Sybilla*, most gracefully gliding down before you, like a ray of light descending through the overhanging branches. Every one who has seen "the White Admiral" (as the old collectors called *L. Sybilla*) fly will willingly testify to the truth of Haworth's remark, that "the graceful elegance displayed by this charming species when sailing on the wing is greater perhaps than can be found in any other we have in Britain." Haworth adds, "There was an old Aurelian of London so highly delighted at the inimitable flight of *Camilla* (*Sybilla*), that long after he was unable to pursue her he used to go to the woods, and sit down on a stile, for the sole purpose of feasting his eyes with her fascinating evolutions."* Black Park is now the nearest locality to London for this species: the larva feeds on honeysuckle. Another of our beautiful butterflies, *Apatura Iris*, is only seen in woods, flying, in July, with great rapidity, during the heat of the day, round the tops of the tallest oaks. It is a species not found near London, but is not rare in woods near Colchester, where I once caught some specimens with great difficulty. Almost the only chance of getting them is about three o'clock in the afternoon, when their flight becomes lower: I put my

* 'Lepidoptera Britannica,' p. 30.

net over one that alighted on the damp earth just before me. The larva feeds on willows: it is of a fine light green colour, and has two horns projecting from the segment behind the head: it is very fearless, and will eat very readily a leaf held to it. *Vanessa Antiopa*, or Camberwell Beauty, is another elegant creature, that pays us a visit now and then, many years intervening between its appearances. It is seen in and about woods in August, and, after hybernation, comes out again in the spring. The larva is said to feed on willow and birch. The last time it was abundant was in the year 1846, when it appeared in many places. In the same year also some other rarities visited us: I remember especially that locusts, *Argynnis Lathonia*, *Deilephila lineata*, *Charocampa Celerio* and *Sphinx Convolvuli* are recorded to have been captured in various localities. The subject of the simultaneous appearance of a species in several places after an absence of some years, and then the sudden disappearance, is very curious, and has never received a satisfactory explanation.

We have five species of butterflies of the genus *Thecla* in Britain, all of which frequent woods. *T. Quercus* abounds on oak trees in July: you may see the females walking about the leaves, sunning themselves; while the males are fluttering in attendance, or pertinaciously holding a tournament in honour of their lady-loves: in these pugnacious encounters they maul each other severely, and you can hardly capture a male whose wings are free from scratches and tears. The larvæ feed on the oak; queer onisciform things they are. *T. Betula* is found on oak trees in August, but

is not nearly so common as the last species: the larvæ feed on blackthorn. *T. Rubi* occurs in May, generally flying about birch bushes: the larva feeds on brambles. The other two species, *T. W-album* and *T. Pruni*, do not occur near London, but they are not rare in the woods of Cambridgeshire and Huntingdonshire: I am not acquainted with their habits.

In the months of May and June the ground, that has been about two years cleared of the underwood, is covered with *Ajuga reptans* in full bloom, round which, in the South of England, *Argynnis Euphrosyne* flies in profusion, accompanied frequently by the "clear-wings," *Sesia Fuciformis* and *S. Bombyliiformis*, which at first sight look like humble-bees; but they are still more rapid in their movements. It is very pleasant to see them, and at the same time

" the bees bustling
Down in the blue-bells,"

which grow intermixed with the *Ajuga*. By the way, how exquisitely adapted is this alliterative phrase of Keats to the subject: it seems to bring the very buzz of the bees to your ears; aye, and to carry music and beauty further, too,—into your heart.

In April the willows come into bloom. In the day-time they are very attractive to bees, *Bombi*, *Andrenæ*, &c., and a few beetles also. At and after dusk the flowers are the resort of several species of moths (Noctuidæ), some of which* have hybernated, and others have just left their pupa state. It is now some fifteen years since the collectors first took moths in

this way, that were likely long to have remained deficient in the collections but for the discovery, by Mr. H. Doubleday, of the attractive powers of the sallow blossoms. I believe it was the same gentleman who found out, about the same time, that a mixture of sugar and beer, mixed to a consistence somewhat thinner than treacle, is a most attractive bait to all the *Noctuina*. The revolution wrought in our collections, and our knowledge of species since its use, is wonderful. Species that used to be so rare that it seemed hopeless to think of possessing them, and others not then known at all, have become so plentiful by the use of sugar in different localities that they are a drug in the hands of collectors and dealers. It is more than probable that new species yet remain to be discovered in northern and unfrequented districts.

The mixture is taken to the woods, and put upon the trunks of the trees, in patches or stripes, just at dusk. Before it is dark some moths arrive, and a succession of comers continues all night through, until the first dawn of day warns the revellers to depart. The collector goes, soon after dark, with a bull's-eye lantern, a ring-net, and a lot of large pill-boxes. He turns his light full on the wetted place, at the same time placing his net underneath it, in order to catch any moth that may fall. Some species are very fond of this trick; others sit very unconcerned; and others, again, fly off at the first glance of the bull's-eye. Once in the net a moth is easily transferred to a pill-box, where it will remain quiet until the next morning. There are some sorts, however, that will not put up with solitary confinement so easily, and fret themselves, that is, their plumage; so it is better to pin and

kill them at once. Some collectors pin all their captures on the spot, for this purpose taking them in a wide paper tube about three inches long, open at one end and closed at the other by a piece of cotton net. The moth being in this tube, the open end is closed by a closely fitting piece of soft wood, which is advanced until the moth has no space in which it can move about; it is then pinned through the net; the piece of wood is withdrawn, bringing with it the moth, which is then killed by a quill dipped in a solution of oxalic acid, and transferred to the collecting-box. This takes some little time to perform, less, however, than would be supposed; but the insects thus obtained are never injured after their capture, which is more than can be said generally of those taken by any other method.

The sugar-bait may be used from March to October with success, not only in woods, but in lanes, gardens, and wherever a tree or post can be found to put it upon. The best nights will be those that are warm, dark and wet: cold, moonlight, or bright, clear and dry nights are always found to be unproductive. It is also of no avail to use sugar in the vicinity of attractive flowers, such as those of sallow, lime or ivy. Sometimes one of the *Geometrina* or *Tineina* comes, and occasionally a good beetle. Wasps and bats also come, but not to the collector's assistance. The former are attracted by the sweets, the latter by the moths; and you may see them go in before you, and pick off a beauty that you would not have lost on any account. Armed with sugar as a spell, the collector becomes a sorcerer, and summons to his presence at his will the moths that, like spirits, lie all around, invisible to mortal ken. Dryads and Panisci come forth from their

retreats, and remain spell-bound within his magic rings. A companion to whom the scene is new may represent Ferdinand, saying,

“ This is a most majestic vision, and
Harmonious charmingly : may I be bold
To think these spirits ? ”

And the collector, as Prospero, may answer,

“ Spirits which by mine art
I have from their confines call'd to enact
My present fancies.”*

Such a sight would almost make one think there was something in the faith that peopled the groves with spirits, which became visible only to the eyes of believers. At any rate, the entomologist has, in this and many other arcana of his occupation, a delight that the unknowing and uncaring world has no idea of.

The sides of lanes in woods should be beat and brushed, and open places, whether permanent or made by clearings, and in which the young underwood is again growing, are grand places for taking insects of all orders, on flowers or by sweeping. The plants in such places should be well examined for Lepidopterous larvæ, both great and small : *Solidago virgaurea*, for instance, for *Cucullia Asteris* and *C. Gnaphalii*, and *Astragalus glycyphyllus* for *Cloantha con-*

* The Tempest, Act iv., Scene i.

spicillaris. Some kinds of larvæ are so common that there is no need to search for them—it would rather be desirable to avoid them: the oaks are frequently denuded by the larvæ of *Tortrix viridana*, and I have seen the hazel, in June, under bare poles from the attacks of the larvæ of *Hibernia defolaria* and other devourers: the luckless collector who ventures to beat at this time is soon covered with caterpillars, which stick to him pretty closely. Many of our fine Lepidoptera—Bombycina in particular—are scarcely to be obtained but by rearing the larvæ to the perfect state; and these larvæ are only to be got by beating the food-trees—not an easy matter, except in a forest where there is no under-wood, and a large sheet can be laid upon the ground under the part beaten. *Notodonta dictæoides*, *N. Carmelita* and *Stauropus Fagi* feed in the larva state on birch; *Notodonta trepida*, *N. Dodonæa*, *N. Chaonia* and *Petasia cassinea* on oak; *Notodonta Cucullina* and *Ptilophora plumigera* on maple; *Ptilodontis palpina*, *Notodonta Dictæa* and *Cerura bifida* on poplar; *Notodonta ziczac* and *Cerura furcula* on willow. These are all Bombycina, and given as examples of larvæ to be obtained by beating trees in woods.

It would fill a book to record the names of the species of moths of which the larvæ are to be taken by beating. At all times when there are leaves on the trees some are to be got, but the best periods are in the early summer and in the autumn. The net known as the clap-net is employed by most collectors for the purpose of beating into, and by reason of its size it affords great advantages, but it is a cumbersome instrument, and fatiguing to use. For tall trees, however, its use cannot be dispensed with; for lower ones and bushes

an umbrella or the ring-net, already described (page 1), are very good substitutes.

In his remarks on digging for the pupæ of Lepidoptera, the Rev. Joseph Greene says:—"Next to parks and meadows I place woods. Searching in woods, however, is a tedious and fatiguing affair, and to search successfully requires some experience. Perhaps the following hints may prove useful. It is in vain to examine the *dense* portions; it is equally vain to dig at the *roots* of trees, with few exceptions; and you will rarely find anything, unless upon trees of considerable growth. The thick moss which collects about the trunks and roots is the part to be examined. Bombyces are generally (almost invariably) found under the moss which covers the spreading *roots*, and not on the trunks. The best localities in woods are the borders and open places. It is curious that such places, when elevated or facing the North, are generally the most productive."*

The numerous plants that grow only in woods feed very many of the larvæ of the smaller moths; some of which have been found, but a great many remain to be discovered. Owing to the variety of economy among these tiny larvæ, there can be no general rules laid down for finding them: some are on the leaves, some roll up the leaves, others mine in their substance; some are in the flowers, others in the seeds; some are in the stems, others are in the roots; some wander about naked as when they were born, others make garments neat and tidy, or rough and grotesque. There is only one rule to be observed—*Search a*

* Proceedings Ent. Soc., 1853, p. 110.

plant all over, and at different times of the year. You may not find the species of which you were in quest, but you may discover another whose economy is unknown, or, as already more than once has happened, one not hitherto seen even in the perfect state.

By beating and sweeping not only are Lepidopterous insects and their larvæ to be taken, but beetles, bees, Ichneumons, flies, tree-bugs, and, in fact, insects of all sorts.

The grass growing about the roots of trees is the favourite hiding-place of hosts of insects, especially Coleoptera. It should be pulled up and well shaken over a sheet of brown paper, and the result carefully examined. The moss growing on the trunks and about the roots of trees is also prolific in small beetles, and the gathering of this in winter will often afford employment to the collector when no other offers. It will be sufficient to shake it well over a sheet of paper, and take home the produce in a bag, for examination at leisure, as already mentioned at page 154. But if you see small pupæ or larvæ, it will be better to separate them there and then. Many a country gentleman, if he would stoop to such employment, could confer very great benefits on his town-living friends by sending them a bag or two of "extract" during the winter.

Old trees of all sorts are the great support of the timber-eating beetles. Such trees are not to be found in any abundance near London; but in such places as the New Forest and Sherwood Forest, where they abound, they afford many Coleoptera, which cannot be elsewhere obtained. Some kinds breed in the solid timber, others in that which is

decaying, or in the Fungi which grow on such wood; and others again only in that which is quite rotten. At times, when searching such trees, the perfect insects are met with; but the way to make sure of good species is to get the wood containing the larvæ and keep it until the beetles appear. All the beautiful tribe of long-horn beetles, several of the Elateridæ and others are wood-feeders.

Bark-beetles are numerous, rarely in sound, healthy bark, but in the dead or dying bark of unhealthy and old trees. Some take to the bark itself, some to the wood immediately below it, others live between the two. It is necessary, in stripping the bark off a tree, to have an eye to those insects that may not adhere to either, and to intercept their escape by a net or umbrella, or by a white cloth laid at the foot of the tree. The rare *Nemosoma elongata*, the genus *Rhyzophagus*, *Cicones Carpini*, *Synchita Juglandis* and *Tryphyllus bifasciatus* are examples of bark-dwellers. *Thanasimus formicarius* and other allied beetles are found under the bark, especially that of felled timber that has lain some time, where they feed upon the larvæ of the bark-eaters. Under the bark of birch stumps at Darenth Wood, in the month of April, I have taken the ferocious-looking larvæ of *Pyrochroa coccinea*; they very soon became pupæ, and the beetles came out in May and June.

The ivy, which loves to twine about old trees, has its heart eaten out by the larva of *Ochina Ptinoides*, a small beetle, which, when once it has taken possession of the wood, never leaves it, but eats on from generation to generation until the stems crumble into dust; aided in its destructive work by some of the *Anobia*.

Mr. Samuel Stevens, some years ago, thus drew the attention of collectors to the capture of Coleopterous insects at night:—"I would strongly urge collectors of Coleoptera to search more by night than they have probably hitherto done, as I am convinced, from the great success I met with myself last season, there are a great many rarities to be found at that time which are not to be obtained in the day. It is a well known fact that most of the Geodephaga are nocturnal ramblers, hiding themselves under stones, &c., in the day-time; but it is not, I believe, generally known that at least two-thirds of the British Curculionidæ have the same habit, to which I can bear testimony. I found it almost useless, in the hot months of July and August last year, to search after Coleoptera in the day-time. The plan I generally followed was to ramble out into the fields and woods as soon as it was getting dusk, and instead of examining my net, as I should have done in the day-time, to throw all the contents into a large bag, and examine it the next morning; and I have always been well rewarded, both in quantity and quality. I have frequently swept till as late as eleven o'clock at night."* The Rev J. F. Dawson has lately followed in the same strain, and says in addition:—"I would call attention to a plan adopted by Baron Chaudoir, which is, to spread a white cloth on the ground at night in some promising locality, with a brilliant light in the centre, and the insects being attracted thereto, may be secured in numbers; and many species, which had not previously been suspected to exist in the locality where the plan is adopted, may by that

* 'The Zoologist,' 1844, p. 700.

means be discovered. Such has been the result; and certainly the contrivance is a good one, where it can be practised without arousing the jealousy and displeasure of gamekeepers and revenue officers."*

Some of the most celebrated woods are, the New Forest, Sherwood Forest, Bewdley Forest, Whittlebury Forest, Hainault Forest, Darenth Wood, Birch Wood, West Wickham Wood and Black Park.

* 'The Entomologist's Annual,' 1856, p. 69.

§ X.

THE WATERS.

“Where creeping waters ooze,
Where marshes stagnate, and where rivers wind.”

“Where the pool
Stands mantled o’er with green, invisible
Among the floating verdure millions stray.”

THOMSON.

THE popular notion about the inhabitants of water is that they are fishes and fishes only; a few persons are perhaps aware that frogs breed in stagnant pools. Take your water-net, and go to a pond or stream in quest of water-beetles, and the passers-by, if they notice you at all, will invariably think you are fishing, or, if they see what you are taking, will ask you if your captures are for baits. If you say “yes,” they will think yours a profitable employment; if you say “no,” you may add as much more in exculpation as you like, you will only pass for a fool. So much for the popular appreciation of Natural History,—and for your encouragement.

But presuming you are above the prejudices of ignorance, and that you are resolved to see the creatures that inhabit the water, go to the nearest pond, ditch, brook or river, always excepting those frequented by domesticated ducks and geese, draw your net quickly two or three times under and around the weeds and grasses, down to the bottom and up again to the top, pull it towards you with the mouth uppermost, let the water drain off, and then see! That large olive-green fellow, marching so conqueror-like over his fellow-beetles, is a *Dytiscus*, the tyrant of the waters, as savage as Nero and as gluttonous as Heliogabalus. Those several degrees less in size, but similar in shape, are *Colymbetes*, probably of several species. Take out all these, and if you want to keep them alive to observe their habits, put them into a large wide-mouthed bottle or jar of water; if you only want them for cabinet specimens they may go into a bottle full of cut laurel-leaves or of weak spirit, where they will soon die. There will then probably remain in the net a lot of small beetles, similar in form to the larger ones, *Hydropori* and *Haliphi*; all very much alike, but belonging to several species. All these beetles are carnivorous, feeding upon the various forms of animal life in the water, including probably their own kindred. The section of water-beetles to which they all belong is called *Hydrocantharidæ*, and represents in the water the *Geodephaga*, or carnivorous beetles of the land. There will also be in the net, no doubt, some of the *Philhydrida*, or vegetable-feeding beetles: they are of a rounder and more convex form, and, like their representatives on land, are far less active than the *Carnivora*. All the water-beetles are fond

of particular places, and even if you find a locality where they abound, you will soon discover that in one pond or ditch they swarm, while in another, or even another part of the same, there is scarcely one to be had. It is necessary, therefore, to dip your net in again and again, and it has not unfrequently happened that the longer one has worked the more abundant were the captures.

A dry summer, when the shallow waters are dried up, is a good one for getting water-beetles, for they are then, of necessity, assembled in fewer places: they migrate according to their wants or their fancies, having, although inhabitants of the water, ample wings for flight. There is reason to believe that they fly at night, but some at least fly in the day-time, for I have caught *Acilius sulcatus* on the glass of a greenhouse, which the beetle, deceived by the reflection of light therefrom, had taken for water, and dropped down on to. I have also frequently found these beetles in dry weather in vacant ponds and water-courses, under stones and leaves, where the earth remained moist.

The Rev. Hamlet Clark has recently published some remarks on the carnivorous water-beetles, in which he says:—"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 on 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 will be 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 the 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 *Hydroporus 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 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 *Hydroporus oblongus* and *Agabus striolatus*, 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 recognise 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 one 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 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."*

Mr. Frederick Holme thus writes on the habits of *Dytiscus punctulatus*:—"I have several times kept specimens of *D. punctulatus* in confinement, both singly and in pairs, but never succeeded in preserving them more than a few months; whereas Esper is said to have kept *D. marginalis* alive three years and a half—an extraordinary longevity, which Stephens attributes, with great probability, to its celibacy. When I kept a pair together, I always found that the male died first; and his dead body had generally been mutilated and pretty nearly devoured by his widow. The females were at all times much more voracious than the males. I generally fed them with raw beef, of which they sucked the juices; but in summer I sometimes supplied them with small aquatic insects, which they seized with their fore feet, and tore to pieces with their mandibles, rejecting the elytra and other hard parts. I also fed them on earth-worms, and once introduced into the bottle a small frog, about an inch and a half long; on my return, a few hours after, the frog had been dispatched and partly devoured, and this by a single specimen. The larva of this and other large *Dytisci* is even more voracious than the imago. I have seen them devouring horse-leeches; and in the Anatomy School at Oxford is one preserved in spirits, along with a small fry of a pike, longer than itself, which it had killed, and was devouring when taken by Professor

* 'The Zoologist,' 1855, p. 4847.

Kidd. The appearance of the insect, when seen through the medium of the water, is extremely interesting, from the rich olive-green of the elytra (which is much heightened in this situation), the yellow labrum and margins of the thorax and elytra, and the silvery brilliancy of the eyes, which appear as if invested with a globule of air. They speedily become familiarised to a certain extent, and will follow the finger round the glass, in expectation of food."*

There are many other records of the voracity of the *Dytisci* and their larvæ, which may be verified and added to by any one who will put some of these beetles into a large glass jar or globe filled with water and containing some common water-plant, in order to preserve the balance between animal and vegetable life, and thus keep the water pure. A series of observations on the species of *Colymbetes* and smaller genera, including the larvæ, would develop new matter and be full of interest. To watch the motions of the water-beetles is very pleasing. Their action is very rapid, the great means of propulsion being the long hind legs, which are used as oars. These limbs are jointed and fringed with long hairs, which spread out when the backward stroke is made, and increase the propelling surface, but when the legs are again drawn forward the joints lose their rigidity and the fringes lie close to the limb; thus the least possible resistance to the water is attained. The form of all the predaceous water-beetles is very similar, the genera are few, the species many, the differences between them being more those of size, colour and marking than of shape.

* 'The Zoologist,' 1843, p. 200.

They are all more or less oval and convex, the sides being bevelled off pretty equally all round, the resulting form being very nearly that of an oval lens—the best that could be adopted for creatures that have to move quickly through a dense medium, because offering the least resistance to it: contrasted with the bulky forms of the aquatic vegetable-feeders this adaptation is very striking. In the jar of water before you, observe that, notwithstanding the Carnivora have as many circumstances in their favour as possible, they have to exert themselves to descend or move laterally, but when they wish to ascend they only spread out their long legs, and then come to the surface without moving a muscle. In clear pools you may often see *Acilius sulcatus* or *Colymbetes bipustulatus* lying motionless at the top of the water, their heads depressed and their tails elevated, the extreme tip being above the surface; in this way air is admitted under the elytra to the spiracles along the sides. When they have taken in a sufficient quantity they swim away until another supply is required, and as they cannot do without atmospheric air, they have continually to ascend and get it.

The whirligig beetles (*Gyrinus*), to be seen in companies on every pool, moving rapidly in curves upon the surface, are very interesting creatures. Every schoolboy knows these brilliant, metallic little beetles, and has made experiments on their habits by throwing a stone among them, when a portion are seen to dive immediately, carrying a globule of air with them, which shines like quicksilver. They are said to feed on small dead floating insects,* but it is probable they

* Westwood's 'Introduction to the Modern Classification of Insects,' vol. i., p. 108.

have some other food than what they could procure so precariously, for they are active at all seasons, often when no other insects are out. I kept two or three alive for some months this year (1855) without being able to ascertain that they ate anything.

During the summer months several kinds of beetles may be found on the leaves of water-plants, among which may be mentioned the various species of *Donacia*, elongate, narrow and with long legs, the thighs of the hinder pair being considerably thickened. They are mostly of different shades of green, but some of them have tints of purple, blue and black. The larvæ live in the stems of aquatic plants, but not much is known about them, and a history of the various species in this state would be very acceptable.

Mr. Wailes has published the following account of the genus *Enicocerus*:—"Examining the stones in a rivulet, within fifty yards of its junction with the sea, in quest of specimens of *Elmis* and *Hydræna*, I observed a beetle, which a moment's inspection assured me was an *Enicocerus*. On commencing a closer search, I found all the three species in considerable abundance, lurking in the inequalities of the coarse stones, just level with or a little above the surface of the water. In this respect these insects differ from the allied genus *Elmis*, whose favourite resort is the under side of rough stones, apparently preferring such as are in the most rapid parts of the brooks, and that side of the stone exposed to the force of the stream. In the Wansbeck they were in the greatest profusion in August. I have also taken them at various places near Newcastle, in October and April, and doubt not they may be met with most months of the

year, though autumn and winter must be considered their principal season. I am borne out in this supposition by the fact of having generally observed the larvæ and pupæ in company with the perfect insect, especially in the autumn. The former (larvæ) are anopluriform, measuring, when full-grown, about $2\frac{1}{2}$ lines in length and half a line in width. They are of an uniform black, and have the apex of each abdominal segment fringed with very short hairs. Their food is most probably mucor, for they seem to be confined to the rough slimy stones; and I find it is quite as great a waste of time to look for them on a smooth limestone as to turn up a fragment of basaltic rock (vulg. *whinstone*) in search of *Geodephaga*. When full-grown the larvæ leave the water, and crawl up the sides of the stone in search of a convenient place in which to undergo their change, and they then commence the task of building their pigmy huts. In doing so they agglutinate small particles of the mud which floods usually deposit on coarse stones; and when finished the cases resemble very closely, though on a smaller scale, the nests of the mason-bees, sometimes met with on the surface of a large stone, or projecting parts of the stone itself. The enclosed inhabitant is of a bright orange-colour, and after remaining a period of probably only a few days it assumes the perfect state, and, patiently waiting till its mandibles are strong enough for the task, gnaws itself a passage, and joins its comrades by the water-side. Here half-a-dozen of them may be found in one cranny, spending their brief lifetime in sipping the nourishment furnished by the stream at their door. Their travels appear very circumscribed, seldom extending beyond a trip to the extreme edge of the moist portion of the stone on which

their lot has been cast, or a ramble for an inch or two below the surface of the water. When, however, an accident, or the indulgence of a roving disposition, compels or tempts them to undertake a voyage of discovery, they are soon thrown by the current into the eddy of some oasis of the watery desert, and slowly, but generally surely, reach the shore. Like the neighbouring genera, the *Enicoceri* are often covered by the stream with a deposit of mud, and then require the keen and practised eye of the entomologist to detect them in their lurking-places." *

A few Hemipterous insects inhabit the water. I may mention two that are common. *Nepa cinerea*, a very flat, woody-looking creature, remarkable for the length and breadth of its fore legs, and for the two bristle-like appendages at the extremity of the body, which serve to conduct the air to the spiracles. *Notonecta glauca*, or boat-fly, which swims upside down, moving itself along by means of its oar-like hind legs. Take care how you handle this creature, or it will pierce through the skin of your hand with its rostrum, causing a pain like that resulting from the sting of the bee, but without any consequent swelling.

Among the Diptera the larvæ of some families are aquatic, and occur in vast quantities in stagnant water, about which the perfect insects are met with. Such are the families Culicidæ and Syrphidæ (*Eristalis*). To the former belongs the too-well-known gnat. The larva becomes a pupa in the water, and still remains active, though it ceases to feed. The perfect insect may frequently be seen emerging from the pupa

* 'The Entomological Magazine,' vol. i., p. 256.

skin, part of which projects above the surface of the water, and serves for a resting-place until the fly is ready to use its wings. The empty skins may sometimes be seen by hundreds, drifted by a breeze to one side of a pond. The gnat has had the honour of having the following lines addressed to it by Rogers. Who does not know their truth!

“ When, by the green-wood side, at summer eve,
Poetic visions charm my closing eye;
And fairy scenes that fancy loves to weave,
Shift to wild notes of sweetest minstrelsy;
’Tis thine to range in busy quest of prey,
*Thy feathery antlers quivering with delight,
Brush from my lids the hues of heaven away,
And all is Solitude and all is Night!
Ah, now thy barbed shaft, relentless fly,
Unsheaths its terrors in the sultry air!
No guardian sylph, in golden panoply,
Lifts the broad shield, and points the glittering spear.
Now near and nearer rush thy whirring wings,
Thy dragon-scales still wet with human gore.
Hark thy shrill horn its fearful larum flings!
I wake in horror, and dare sleep no more!”

The well-known caddis-worms, which live in water, in portable cases composed of bits of vegetable matter and shells of aquatic Mollusca spun together, are the larvæ of the Phryganidæ, or caddis-flies of anglers. Some of the cases are very much like those of some of the Psychidæ on land, and the inhabitant projects its thoracic segments in a similar manner to those larvæ when it moves about. Some authors have considered these insects to belong to the Neuroptera; some

to the Lepidoptera; while others have proposed that they should constitute a distinct Order, named Trichoptera. I presume not to say who is right.

The Ephemeridæ, or May-flies of the angler, a family of Neuroptera, proceed from larvæ which live in water, those of some species, it is said, for the space of two or three years,—a strong contrast to the duration of life in the perfect state. “Their elegant flight in swarms (composed, as in the gnats, almost entirely of male insects) in fine afternoons over or near water, alternately rising and falling, must have attracted the attention of the most incurious: in this operation the upward flight is produced by the repeated action of the wings; but in descending, the wings are widely extended, as well as the tails. A few hours previously they had been the inhabitants of the water, from which, in the pupa state, they had crawled to the surface, where they cast off their pupa skin, appearing at first sight to be fully developed, with the wings extended to their full size: they then make their way, flying with difficulty to the shore, where they affix themselves to the trunks of trees, stems of rushes, walls, or even upon persons standing upon the bank, when they again cast off a very delicate pellicle, in which they had been entirely encased, and which remains unchanged in form, attached to the objects on which they had stationed themselves: the skin, however, in which the wings had been enclosed, shrivels and curls up into a mass, hanging down at the sides of the thorax: after this process the wings, disengaged from the outer covering, assume a brighter appearance, and the tails grow to twice their previous length.”*

* Westwood's ‘Introduction to the Modern Classification of Insects,’ vol. ii., p. 27.

Mr. A. H. Davis has recorded the manner in which this last process was performed in a species that came under his notice. "On a fine evening towards the latter end of May I was collecting in the neighbourhood of Brixton, near some ponds, when I was suddenly covered by a multitude of a small species of *Ephemera* — I think the genus *Cloëon*. They settled on me apparently from my being the most conspicuous object near on which to undergo their final transformation. Their colour was of a dusky white and opaque. They retained their position without moving, enabling me to observe beneath the glass the process by which these fragile creatures withdraw themselves from the comparatively cumbersome garment which envelopes their beautiful and aërial form.

"Immediately on settling, the wings were laid flat at right angles with the body, and the insect remained about half a minute in a state of repose. A slight motion then appeared about the bases of the wings, which gradually collapsed, and were drawn alongside the abdomen. At this moment the insect resembled a piece of dirty cotton wool with little form. The elevated portion of the thorax now distended, and then gave way longitudinally, exhibiting the bright brown thorax of the insect, which was rapidly followed by the head and anterior legs. After this effort the insect rested a few seconds. The next discernible motion was in the two or three last segments of the abdomen, where the muscles were in violent agitation, evidently for the purpose of extricating the fine setæ which adorn that part. The contraction continued upward; and the wings, freed from the flimsy covering, were fully developed, and in an instant the delivered captive took its flight:

the whole process strongly resembling the drawing off of a tight glove. The whole operation did not, in most cases, exceed three minutes; in some cases less." *

The Dragon-flies, popularly but erroneously termed "Horse-stingers," are produced from larvæ that live in water. Horrible, big-headed, long-bodied creatures they are. You you will often bring them up in your water-net. The perfect insects have four long wings, crossed all over with delicate nervures, giving them the appearance of net. They are most active and voracious creatures, sailing about in the air with great ease and velocity, preying upon insects which they catch on the wing, ever and anon settling upon some dry twig, but wary to a degree and difficult to catch. There are many native species which are generally found near water; but sometimes they wander from it, and may be seen coursing up and down the sides of roads or woods. Some of the smaller species, however, are feeble and delicate, and are easily taken. All the species are more or less ornamented with bright colours, which are difficult to preserve after death.

Marshes, especially those of Norfolk, Cambridgeshire and Huntingdonshire, are fertile in insects. The beautiful Swallow-tailed butterfly (*Papilio Machaon*) abounds, so also did the splendid *Lycæna dispar*, or Large Copper, until, about ten years ago, a flood came and drowned all the larvæ; and since then not one butterfly has been seen. Among the larger moths the genera *Leucania*, *Simyra* and *Nonagria* are confined to marshy localities, the larvæ feeding on or in reeds

* 'Entomological Magazine,' vol. ii., p. 322.

and other aquatic plants. Some of them which were common at Whittlesea Mere, since it was drained are likely to become extinct. Horning Fen, in Norfolk, is the only known locality for the moth *Lithosia muscerda*. A great many Coleoptera are peculiar to marshy ground and the banks of rivers and ponds. They may be found among the grass, sedge and other vegetation, also under clods and stones.

Trees growing in wet places, such as willows, poplars and alders, feed a great many insects. The larvæ of the goat-moth abound in the wood of willows, and those of *Cerura vinula*, or puss-moth, upon the leaves. The larvæ of the large kitten-moth (*Cerura bifida*) feed on the leaves of poplars, and spin their hard pupa-cases on the trunks, where they are very difficult to see. *Cerura bicuspis*, a rare species, does the same on alder. Sallows feed *Cerura furcula* and a host of other sorts of caterpillars; and the leaves of all these trees are mined by the caterpillars of several kinds of small moths, belonging chiefly to the genera *Nepticula* and *Lithocolletis*.

§ XI.

THE SEA-SHORE.

“ There is a pleasure in the pathless woods,
There is a rapture on a lonely shore,
There is society, where none intrudes,
By the deep sea, and music in its roar :
I love not man the less, but nature more,
From these our interviews, in which I steal
From all I may be, or have been before,
To mingle with the Universe, and feel
What I can ne’er express, yet cannot all conceal.”

BYRON.

EVERY summer Englishmen rush to the sea-side in thousands, for all kinds of reasons, real or alleged. And when they get there they discover that they have brought the cause of the disquiet that drove them from their homes with them,—that it is in themselves. They know nothing of the sea, the shore, or their peculiar products ; and they are very little impressed by the vastness and grandeur of the ocean, if we may judge by the little interest they take in its phenomena, and the way they kill time by empty amusements. Would that they were naturalists, even in the

lowest acceptation of the term, not only for their own sakes, but for advantages science would derive from their casual attention. I cannot think that all the sea-side visitors are willingly idle; but, taken out of the round of their usual occupations, they either have no idea of the objects by which they are surrounded, or do not know how to set about finding them. The Entomology only of the shore, to say nothing of its Geology, Botany, or general Zoology, would afford ample employment to all who are now so sadly in want of objects on which to employ themselves; and it may be an encouragement for such to be told this is a comparatively untrodden field, for that hitherto entomologists have attended to the insects of the coast less than to those of any other locality; but, as far as their researches have gone, the results are most promising.

It is no less singular than true, that hitherto, notwithstanding the sea is so prolific in life, not one true insect is known to exist in its waters; the place of insects being apparently supplied by the creatures nearest to them in the scale of organization, the Crustacea. Possibly some remain to be discovered, for it is known that sea-water is not absolutely fatal to insect-life; the examples being a few species of beetles, whose natural habitat is below high-water mark; so that they are submerged for a considerable period twice in every twenty-four hours. These beetles are *Aepus marinus* and *A. Robinii*, found under stones on several parts of the coast; *Diglossa mersa*, local on the coast near Dublin; *Micralymma brevipenne*, discovered on the South coast of Scotland, by that amiable and accomplished naturalist, the late Dr. George Johnston, of Berwick-upon-Tweed; and the species

observed by Mr. Wollaston near Weymouth, as hereafter mentioned. Of *Diglossa mersa* Mr. Hogan writes:—"The best and most accessible locality is at Baldoyle, between the peninsular of Howth and Dublin, on the beach behind the station-house, where, if the tide be out and the sun shining, the collector will soon reap a plentiful harvest. The *Diglossa* is sometimes to be seen running over the sand, but its peculiar habitat is below high-water mark, under stones half imbedded in the sand, not those loosely scattered about. One specimen only is found under a single stone; and as soon as uncovered the little black creature is seen twisting about in the endeavour to hide itself; when, if not immediately secured by a moist finger or a quill, it will defy all attempts to extricate it a second time." *

The sand close to the sea, even that which is occasionally overflowed by high tides, is the native country of several beetles. Such are the beautiful *Cicindela*; *C. maritima*, "which flies more heavily than the common *C. campestris* and not so far at a time," † and is not rare on the South coast; *C. hybrida*, "abundant on the sandy coasts of Lancashire and North Wales;" ‡ and *C. Germanica*, which, "unlike its congeners, does not make use of its wings to effect its escape, but runs with amazing rapidity: local; but found in profusion near Charmouth and Swanwich, Dorset; Black Gang Chine, Isle of Wight, &c." § Another coast-dweller, one of the real black-beetles, is *Broscus cephalotes*, common in many places

* 'The Zoologist,' 1852, p. 3464.

+ 'Entomological Magazine, i., p. 93.

‡ 'Geodephaga Britannica,' p. 3.

§ Id., p. 4.

and conspicuous by its size. The late Mr. Robert Foster thus wrote about the habits of this species :—"These insects are found only in the sand, and live in dens about three inches deep and half an inch wide, which are made in a diagonal position in the sand, where it is mixed with decomposed stalks of *Elymus arenarius*. They appear to rove during the day occasionally, but upon any alarm run swiftly to their dens, projecting from the mouths of which their heads may be seen watching for prey. On holding another beetle to the hole, the one within would immediately seize hold of it with its jaws, and continue so tightly fixed as to suffer itself to be drawn out without quitting its hold. They appear to be very ferocious insects ; and, from the number of elytra and other parts strewed about the sand, it may be supposed that they prey on each other." *

There is a genus of small beetles, *Dyschirius*, some of the species of which are abundant on the coast, though others are more partial to the fens and the alluvial soil at the mouths of rivers. In an account of the habits of the genus, Mr. Wollaston has the following remarks :—"In the Isle of Wight, last May, when in company with my friend, Mr. Dawson, we could have captured hundreds (of *D. gibbus*) in a single sand-heap, in which we found them burrowed to the depth of more than a foot. At Tenby, in Pembroke-shire, I have likewise taken the same species, accompanied by a single specimen of the beautiful *D. nitidus* ; also at Northam Burrows, near Bideford, on the sand-hills facing the sea. At Lowestoft, on the coast of Suffolk, I met with a

* 'Entomological Magazine,' i., p. 92.

plentiful harvest during the early part of last July, where I obtained a fine series of the species *nitidus* and *thoracicus* by the following simple process:—the cliffs being composed of sand, I used to stroll along the beach until I saw a *Dyschirius* making his way at their base, when, instead of immediately taking him up, I sat quietly down and observed to what crevice he was tending: having watched him safely in, I split off the sand in extremely thin layers, when numbers of his own species were sure to fall out; this plan I found far more successful than merely splitting away the cliff at random. It is a remarkable circumstance that they are nearly always found in company with one or other of the Brachelytrous genus *Hesperophilus*. Without strict observation this might not often be apparent, for the two genera being in the times of their appearance entirely dissimilar—the *Dyschirii* coming out only in the heat of the sun, and the *Hesperophili* solely in the evening—it is not likely that this singular fact would be noticed. It is curious to speculate on what could be the object of their excessive intimacy, for, so far as company is concerned, the habits of the species are too dissimilar to render them of much service to each other, inasmuch as when the *Hesperophili* are ‘at home’ the *Dyschirii* are abroad, and when the *Dyschirii* are ‘at home,’ the *Hesperophili* are abroad! This great fact was most admirably illustrated at Lowestoft, where, during the heat of the day, the *Dyschirii* might be observed sporting rapidly about in the sunshine, but verily not the ghost of an *Hesperophilus*

‘Shewed o’er the arid waste his misty form.’

In the evening, however, the *Dyschirii* had entirely disappeared, and their place was taken by their little Brachelytrous cohabitants, who were ranging far and wide over the surface of the sand, though with much slower and clumsier movements than were displayed in the rapid and easy motions of *Dyschirius*.*

Mr. Wollaston again reverts to this subject in his 'Notes on the Coleoptera of the South of Devonshire,'† where, writing of the Chesil Bank, near Weymouth, he says, "Its length in all is about ten miles; but the collecting-ground, which is somewhat less than one mile, is not properly a part of the bank itself, but a quantity of sand-hills attached to that part of its course where the back-waters find their exit through a narrow mouth into the open sea. These sand-hills, in fact, form one side of the mouth of this long arid river-like gulf; and a wooden bridge connects them with the opposite land. When the tide is out there is a large sandy flat, close to the bridge, and joining on to the sand-hills. Whilst observing the beautiful undulations in the sand, caused by the action of the water as it receded over its surface, I beheld almost an innumerable quantity of minute holes or perforations scattered in every direction around me. This led me to investigate their meaning, and on gently opening one of them with a penknife, I discovered a specimen of *Cillenum laterale* at the distance of about a quarter of an inch below. The sun then began to shine, and in less than a minute I beheld a scene which it will not be easy to forget. I had been accustomed to look upon

* 'The Zoologist,' 1847, p. 1672.

† Id., 1847, p. 1936.

Cillenum laterale as one of our rarest maritime insects, and had never seen it in a living state before; but here, in almost an instant, as it were by magic, I found myself surrounded by an innumerable multitude of them running rapidly over the sand, from hole to hole, in every conceivable direction. * * * * I had not proceeded many yards before something else, glistening even brighter still, caught my attention. This I instantly recognised as my old friend *Dyschirius thoracicus*, and therefore I was immediately on the *qui vive* for his comrade *Hesperophilus*, who as usual did not deceive me, for verily I never beheld an insect in greater profusion in my life: in some parts the sand was literally alive with them. If *Cillenum laterale* occurred (as it did) by thousands, surely *Hesperophilus arenarius* existed by *tens* of thousands! Towards the evening they were most abundant, but in such profusion did they inhabit the sand that at all times some at least of them appeared on the alert. It gave me the greatest satisfaction to observe the mixture of *Dyschirii* and *Hesperophili* on a scale so gigantic, because it bore the most substantial and incontrovertible evidence to opinions which I had before expressed when discussing the habits of the *Dyschirii*. Nor was *Hesperophilus* the only companion of that group with *Dyschirius*, for in the same locality I discovered, though in less profusion, the beautiful and conspicuous *Bledius armatus*."

The sand-hills which occur on many parts of the coast are among the very best entomological localities in existence. Walk over the district at any time of the day, and you will see signs of insect-life; sit down and you will perceive more — many things, in fact, that were not in focus when

your eyes were four or five feet from the ground: stoop still lower—nay, spread yourself out flat—and you will be surprised at the number of creatures you had overlooked from your second position of observation, for many of the beetles are so much of the colour of the ground that they cannot be distinguished but when your eyes are in proximity to them. Not yet have you exhausted the wonders of the spot; pull up carefully the grass or other plants within your reach, shake them over a white cloth, and watch. At first nothing may be visible, but in ten or fifteen minutes you will see a diminutive creature on all six feeling his way out of yours. If you had been in a hurry you would have treated him as dirt, and flung him away or trampled on him, so admirably did he tuck in his head and legs and sham dead. I guess, as the Yankees say, he knew you wanted him, and lay still till he thought he could move off, under cover of the rubbish, undetected. Having secured this one, if you look quietly you will probably find some of his brethren or cousins who have just awoke; they may follow their leader into your collecting-bottle, and if eventually you secure a good many of these gentry you will have the pleasure of giving them to those of your friends who have not been able to pass a day or two at the sea-side.

Deal, the Norfolk and Suffolk coasts, the Chesil Bank near Weymouth, Swansea, New Brighton, Cheshire, and the coast of the Isle of Wight, are among the most celebrated shore districts; though it is perhaps not the best way possible to point out well-known places, but beg each sea-side visitor to search well any spot on the coast he may go to.

When looking for beetles, nocturnal Lepidoptera will be

found buried among the grass or at times covered up in the sand. Their larvæ and pupæ also are frequently met with, and should be carefully preserved: they are probably of species peculiar to the coast.

Undercliffs are grand resorts for insects of all orders: even in winter they will afford the collector much employment. There is one between Dover and Folkestone, where, in November, 1849, I found in the dry, or rather wet, seed-heads of the carline thistle (*Carlina vulgaris*) plenty of the larvæ of a moth, which I kept until the following July, when out came *Parasia Carlinella*, a perfectly new species. At the same time I found in the seeds of the burdock, *Arctium Lappa*, a quantity of the larvæ of *Parasia Lappella*, which became moths in June following. Although these two species of moths are closely related they are perfectly distinct, and the larvæ, although much alike, have a different habit in feeding, those of the former species feeding in the receptacle of the flower below the seeds, and those of the latter eating their way right through the seeds.

On the same ground, last June, a friend of mine, while sweeping for beetles, had the good fortune to capture a specimen of *Trochilium Chrysidiforme*, one of the very rarest of our Lepidoptera, which he most liberally presented to me while yet alive. Another insect, *Odontia dentalis*, not now so rare as before its partiality to the coast was discovered, I found here in some plenty, in July, 1850, in *Echium vulgare*, by beating the plants with a stick, catching them easily with my net as they flew out. They were very local, for although the plant abounded the

moths were only to be had on one spot of a few yards in extent. The larvæ feed on the *Echium*, and make a spinning among the leaves in which to change to pupæ. The moth is of a pale yellow colour, the upper wings crossed with two dark lines, the outer edge of which has several sharp denticulations, giving the insect a very peculiar and unique appearance.

An undercliff at Lulworth Cove, Dorset, is the only known locality in Britain for *Pamphila Actæon*, but so abundant was it there in 1849 that, in a short time, I captured a hundred, and a companion took as many more.

One of our rarest butterflies occurs only on the coast, and two others are found more frequently there than inland. The former is *Pieris Daplidice*, only taken at Dover; the latter are *Colias Hyale* and *Argynnis Lathonia*. *Melitæa Cinxia* inhabits, but only in the Isle of Wight, uncultivated declivities near the sea, appearing in May; the larvæ feed on the narrow-leaved plantain. The Rev. J. F. Dawson, writing in 1846, says, "This Fritillary was much less plentiful last season than heretofore; and in some of its former haunts has quite disappeared. It has many foes: for besides the march of improvement in cultivation, which gradually invades its haunts, the same natural causes which promote its abundance also multiply its enemies. *Silpha obscura* and *S. tristis* destroy the larvæ; and a large ground-spider, very numerous in the spots which it frequents, feeds on the perfect insect: it lies in wait till the butterfly alights on the low plants, or on the ground, then rushing forward, seizes it by the neck, and holds it captive with such

tenacity that both insects may almost be pulled in pieces ere it will relax its grasp."*

On the Lancashire and Cheshire coasts are taken several Lepidoptera that are not seen in the South. Such are *Leucania littoralis*, *Actebia præcox*, *Epunda lichenea* and *Rhodaria sanguinalis*. On the sand-hills at New Brighton, as early as the middle of March, *Nyssia zonaria*, of which the female is wingless, makes its appearance, sometimes in great abundance. To view these sand-hills, you would wonder how insects could exist at all: the sand is continually shifting, and to such a degree that grass and bushes are often buried many feet deep, and yet the locality is capital for many insects not found elsewhere.

Salt marshes are the abode of several insects which live on the plants growing in them and the brackish waters. Mr. Wollaston says of Lymington Salterns, after mentioning several rare beetles which he took there:—"I know of no district in England, on so small a scale, which would be more likely to produce a greater number of novelties, or which would more amply repay the exertion of an entomological investigation."†

The Isle of Sheppey is most excellent collecting-ground both for Coleoptera and Lepidoptera. Here occurs, in May, *Psyche reticella*, a species of this singular genus of moths not found elsewhere in or out of Britain.

On the salt-marshes at St. Osyth, in Essex, I had the good fortune to take several fine insects: these were *Gelechia*

* 'The Zoologist,' 1846, p. 1272.

† Id., 1847, p. 1898.

instabilella, *Adactylus Bennettii*, *Catoptria Wimmerana*, *Phorodesma smaragdaria*, and the larvæ of *Clisiocampa castrensis*, all good species, and some quite new; besides others not quite so rare.

I have already cited the Isle of Wight as the locality for *Melitæa Cinxia*, but I ought to add that the whole of its coast is first-rate entomological ground. I may mention the rare *Agrotis lunigera* as one of the specialities captured here with sugar; and as another, *Cucullia Absinthii*, of which the larvæ feed on the sea-wormwood.

The Isle of Portland is not very productive, but it has its peculiar insects. *Heliophobus hispida* is a rare moth, found sitting on the broken rocks in September, and in July I have taken the still rarer *Acidalia degeneraria*, below Rufus's Castle.

Deal, before mentioned in connection with beetles, is a locality for many fine Lepidoptera, the splendid *Plusia bractea* being at the head of the list: it is taken, in July, flying about flowers at dusk.

Brighton has lately become celebrated on account of some fine moths taken there by means of lamps. *Leucania musculosa*, *Phlogophora empyrea* and *Callimorpha Hera*, the last two being quite new to the British list, are famous captures. On the beach I saw plenty of *Gelechia Brizella*, in August, two or three years ago, the species being until then one of our greatest rarities.

The lighthouses at times attract many night-flying moths. *Ennomos Alniaria* was once taken at the North Foreland lighthouse, and it is recorded that the keeper

of the Lowestoft light has had to sweep the lantern to clear away the moths that swarmed on it to so great an extent as to obscure the light.

Thus I could go on and fill a book with coast-localities and names of species. But my space warns me to desist, and I trust that, although I could say much more, I have said enough to show that there is ample employment for all who wish to search out the entomological "wonders of the shore."

§ XII.

THE MOUNTAINS.

“ To sit on rocks, to muse o’er flood and fell,
To slowly trace the forest’s shady scene,
Where things that own not man’s dominion dwell ;
And mortal foot hath ne’er or rarely been ;
To climb the trackless mountain all unseen,
With the wild flock that never needs a fold ;
Alone o’er steeps and foaming falls to lean ;
This is not solitude ; ’tis but to hold
Converse with Nature’s charms, and view her stores unroll’d.”

BYRON.

“ WHOEVER has not ascended our mountains knows little of the beauties of this beautiful island. Whoever has not climbed their long and heathy ascents, and seen the trembling mountain flowers, the glowing moss, the richly-tinted lichens at his feet ; and scented the fresh aroma of the uncultivated sod, and of the spicy shrubs ; and heard the bleat of the flock across their solitary expanses, and the wild cry of the mountain-plover, the raven, or the eagle ; and seen the rich and russet hues of distant slopes and eminences, the livid gashes of ravines and precipices, the white glittering line of falling waters, and the cloud tumultuously whirling round the lofty

summit; and then stood panting on that summit, and beheld the clouds gather and break over a thousand giant peaks and ridges of every varied hue—but all silent as images of eternity; and cast his gaze over lakes and forests, and smoking towns, and wide lands to the very ocean, in all their gleaming and reposing beauty, knows nothing of the treasures of pictorial wealth which his own country possesses.”*

How true all this is those who have made a tour in Wales or the Highlands of Scotland will readily declare. I speak from experience when I say that the entomologist loses nothing of all the charms of scenery, while in capturing the insects peculiar to the North, which continually occur, he has, in addition, pleasures the most exciting. In those species of *Lepidoptera* which are also found in the South, the variations of colour are very remarkable, the hues being invariably darker and richer—a circumstance I have not heard accounted for. Most of the Scotch insects are also found in the northern latitudes of Europe, the plants and climate being much alike—two of the circumstances which have the greatest influence in determining the geographical range of species. Among the more remarkable *Coleoptera* in Scotland are *Elaphrus Lapponicus*, an inhabitant of boggy places on the Catlaw and Clova Mountains: almost all the specimens, however, have been taken by Miss Lyell, and greatly indebted are entomologists to that lady for the trouble she has taken to procure them this fine species. Loose stones are the favourite resting-

* Howitt's 'Book of the Seasons,' p. 324.

places of *Carabus glabratus*, *Miscodera arctica* and other fine Geodephaga. Indeed the number of beetles that lies hid under stones is wonderful; and on the moor, the mountain and the rill-side, the entomologist always, if he finds not "sermons in stones," may get a text to preach from, under every one.

The Black Forest, in Perthshire, has, within the last ten years, been much frequented by English collectors, and a rich harvest of insects, either not before known in Britain or extremely rare, have they gathered. Within its domains the following fine species have been collected: *Pytho depressus*, *Dictyopterus Aurora*, a fine scarlet creature, *Asemum striatum*, *Saperda scalaris*, *Lamia textor*, *Pogonocherus fasciculosus*, *Astynomus ædilis*, *Trichius fasciatus*. The last two species are very remarkable: *A. ædilis* has slender antennæ, in the male nearly four inches long, and four times the length of the body; it flies only in the hot sunshine, and to see it sailing majestically through the air, as it goes in search of some newly-felled fir tree, is beautiful. *T. fasciatus*, called the bee-beetle, from its being somewhat like a bee at first sight, has yellow wing-covers spotted with black, the thorax and body densely clothed with yellow pile. It is a very pretty creature, and has delicate tastes appropriate to beauty, being fond of flowers, chiefly those of thistles.

The Scotch waters will repay an examination. So lately as September, 1854, the Rev. Hamlet Clark found *Dytiscus Lapponicus*, a water-beetle quite new to our list, in a small, very deep lake in the Isle of Mull. *Agabus arcticus*, *A. congener*, *A. dispar*, several species of *Hydroporus*, &c.,

occur only in the North, and it is not unlikely that there are other species not yet found in Britain that remain hidden in the lakes and streams of Scotland.

Among the Lepidoptera the following seem most worthy of mention: *Erebia Cassiope* and *E. blandina*, both truly mountain species; *Polyommatus Artaxerxes*, formerly abundant on Arthur's Seat, near Edinburgh, but found also in other parts of Scotland; and *Spælotis cataleuca*, which flies with the utmost rapidity in the sunshine on Arthur's Seat. At the summit of Schehallion, *Psodos trepidaria* flies in the sunshine; that it should fly at all at such an elevation is, considering the fragility of its structure, truly surprising: it might have been expected that the females at least would be apterous, but they are not. On the same mountain occurs *Scopula alpinalis*, one of the Pyralidina. On the mountains near Blair Athol, in August, 1838, I took, at an elevation of three thousand feet, a single specimen of *Cryobia alpina* sitting on the face of the rock, the wind blowing upon it so strongly that it was with the greatest difficulty I secured it: this was the first British specimen, and only one other has been taken since. On the moors, *Anarta melanopa* and *A. cordigera*, both elegant moths, fly with the greatest rapidity in the sunshine, and can then be caught with difficulty: in dull weather they may be seen sitting on the stones or rocks. Several other moths may be found sitting on rocks: the Noctuina may be pinned easily, but the Geometrina will mostly fly off, and require a net to capture them. Of the former division I may specify *Hadena rectilinea*, *Acronycta Myricæ*, *A. Menyanthedis* and *Polia Chi*; of the

latter division, *Charissa obfuscaria*, *Harpalyce cæsiata* and *H. flavicinctata*. *Plusia interrogationis*, very like in appearance and habit to its relative, the common *P. Gamma*, is seen "flying in the sun among burnt heath: the moths invariably rest upon the burnt twigs of the heath with the head downwards: they are difficult to capture, from the rapidity of their flight."* The Noctuina above mentioned will also come to sugar, by which attraction also may be captured such fine species as *Luperina furva*, *Hadena assimilis*, *Calocampa vetusta*, *Agrotis obelisca* and *Graphiphora Sobrina*. Among the Tortricina some of the best Scotch species are the following: *Peronea Scotana*, *P. maccana*, of which the larva feeds on the whortle-berry; *Amphysa prodromana*, which appears very early in the year; *Sericoris micana* and *S. Daleana*, *Euchromia flammeana* and *E. Arbutana*, *Cnephasia Penziana* and *octo-maculana*, *Coccyx finitimana* and *C. cosmophorana*, *Retinia sylvestrana*, *R. resinella* and *R. duplana*. Among the Crambina the most worthy of enumeration are *Crambus Ericellus*, *Eudorea alpina*, *E. atomalis* and *E. gracilalis*. Among the Tineina I can but notice *Tinea arcuatella*, *Nemophora pilella*, *Depressaria ciniflonella*, *G. boreella*, *G. galbanella*, *G. politella*, *G. solutella*, *Röslerstammia pronubella*, *Chrysoclista Schrankella*, *Elachista Kilmunella*, *E. apicipunctella*, *E. zonariella*, of which last the larvæ mine the leaves of the grass *Aira cæspitosa*; *Lithocolletis Vacciniella* and *Nepticula Weaveri*. The last two species feed at the same time and on the same kind of plant,—the

* 'The Zoologist,' 1847, p. 1883.

Vaccinium Vitis-Idæa,—but in different ways, although both are miners: the former mines the under side of the leaves, after the usual fashion of its genus; the latter mines the leaves so that they pucker, and in the chamber thus formed the cocoon is constructed—a very unusual proceeding in the genus, for, with the exception of *N. Septembrella*, the cocoon is always made outside the mined leaf.

In this Black Forest the fir and birch trees appear to afford food to the bulk of Lepidoptera and Coleoptera, but there are other trees and shrubs that produce their specialities, and none should be neglected; nay, the very mosses and lichens should be well searched. In the ants' nests, some of which are of immense size, will be found two insects that seem particularly attached to them—namely, *Cetonia ænea* and *Tinea ochraceella*. Mr. Weaver, writing from Rannoch, says, “The larvæ of the rose-beetle (*Cetonia ænea*) I discovered here, live for three years in ants' nests, and feed on the ants' eggs (pupæ), of which they devour great quantities, which I learned by keeping and feeding some therewith for several months. I have seen them of all ages, and, although exposed to thousands of ants, I never saw them molested. I have seen the beetle alight on a large ants' nest, and dive into it without fear to deposit its eggs. The larva changes to a pupa within a cone of its own making, but still within the ants' nest.

“With respect to *Tinea ochraceella* I believe that its larvæ feed in the ants' nest, for I always rout the insects out of the nest, and they have no disposition to fly away

from it.”* I believe it is now ascertained that these larvæ feed on the wood of which the ants’ nest is composed.

The connection of various insects with ants’ nests has been before alluded to; the subject is very singular, and worthy of investigation. The French entomologists have worked much more at this difficult enterprise than the English, and with very good result, as far as acquisition of species goes. One of our countrymen having learned that the secret lay in sifting the nests of the wood-ants through a sieve, whose meshes would only let pass the small beetles or particles of the same size, procured a sieve and a shovel, took a table-cloth, and with his boy Tim sallied out into the woods. Down went the cloth as for a pic-nic, on a clear space away from the ants’ nest, and “Now, Tim,” said papa, “do you sift what I bring to you.” A shovelful of the nest was brought and deposited, papa retired to bring another, and Tim began to sift. When papa returned the second time, there was no Tim; he had sifted till he was covered with ants, and then he found it was time to shift, for they bit tremendously; so he flung down the sieve, and tore away into the wood to try to get rid of his tormentors, where he was, after awhile, found by papa, who had no little difficulty in clearing his son from his excited foes; and both father and son then agreed they had had enough of ants’ nests. When they returned to the scene of their labours all their implements had vanished—by what means was never made apparent. I give the story as a warning

* Proceedings Ent. Soc., 1851, p. 106.

to all who, stimulated by the reputed entomological wealth of ants' nests, would venture on the experiment of searching such heaps.

The Scotch junipers have produced two good moths, *Thera variata* and *Ypsolophus Juniperellus*. The larva of the latter makes a spinning among the foliage just like that of *Y. marginellus*.

Cordulia arctica, one of our rarest dragon-flies, has been taken in the Black Forest by Mr. Weaver.

Several rare bees occur in Scotland, which I have no space further to allude to.

The mountains of Wales do not apparently produce many rare insects; but there are a few good things only found there. *Stilbia anomala* I took on Cader Idris; *Agrotis Ashworthii* is taken at sugar near Llangollen in July; and *Trochilium Scoliaforme*, a new British species, whose larva feeds within the wood of the birch, has occurred near Llangollen.

Dosithea eburnata, also a new British species, was found in North Wales last summer; also *Botys terrealis*, whose larva feeds on the golden rod; and *Pterophorus plagiodactylus*, a new species in this country.

Several of the Geodephaga or ground-beetles are found on the Welsh mountains in abundance, although rare elsewhere. The Snowdon district is known as the locality for a beautiful striped coppery beetle, *Chrysomela cerealis*: in 1839 I found one on the top of Snowdon, sunning himself on a stone, or rather he was waiting there for the gleam which was long in coming. Since that time

many specimens have been taken among the wild thyme, on which Mr. Foxcroft discovered they fed. Last year Mr. Weaver captured *Rhizotrogus ochraceus* in North Wales, flying by daylight: it is very like *R. solstitialis*, the common midsummer chaffer, but is, besides other differences, both narrower and shorter.

Ireland is not very celebrated for its entomological productions; possibly insects were included amongst the "varmin smothered up" by St. Patrick. *Hydrilla Banksiana* is found in the bogs, and I do not at this moment remember any other moth that is peculiar to Ireland. In the South *Phosphuga subrotundata*, a species not found in England, occurs, and another beetle, described by Mr. Newman under the name of *Phyllopertha suturalis*, was "taken by Mr. Bevington, in immense profusion, on the sea-coast in the North of Ireland."* This insect has been since deemed only a variety of *P. horticola*, but I am not convinced, and only the comparison of a number of specimens can settle the matter.

Mr. Wollaston made a tour in the South of Ireland, and has published his observations on the Coleoptera, from which I make two or three extracts:—"At Killarney, as well as in other neighbourhoods, the water-insects stood pre-eminent. The lakes themselves harboured next to nothing,—but every river running into them, every mountain tarn, and every little stream in the whole vicinity were positively choked with Coleoptera, albeit the *species* were but few. In the mountain tarns the species

* 'The Entomological Magazine,' vol. i., p. 509.

were even less numerous, nevertheless the number of *specimens* was prodigious. If we turn to the *land* species of this district, we at once find the great preponderance which the commoner *Geodephaga* display—a race which, next to the *Hydradephaga*, rank undoubtedly foremost in point of numbers. At Glengariffe, in the county of Cork, I met with tolerable success; but here, as in all the other maritime localities, the *Brachelytra* occupied the largest portion of the insect community. Further inland the county of Cork opens a far richer field to the entomologist. The exertions of my friend, Mr. Clear, have proved the immediate neighbourhood of Cork to be a good one, and it is to him I am indebted for a new and very beautiful *Hydroporus*, captured in the river Lee. The rare and interesting *Melolontha Hippocastani*, he informs me, he has been accustomed to take sparingly near Bandon; from which locality I am indebted to him for water-insects, including *Elmis Volkmar*, *variabilis* and *parallelopipedus*. The neighbourhood of Kanturk produced me a far richer harvest than I reaped in any other part of Ireland. At Rosnalie, the seat of W. Leader, Esq., I had a good opportunity of investigating this unexplored district. Situated on the river Blackwater, and surrounded by a variety of soils, few spots in Ireland which I saw opened a wider and more extensive field for Natural History in general.”*

Thus I must conclude a very meagre account of the entomological riches to be expected in Scotland, Wales and

* ‘The Zoologist,’ 1847, p. 1570.

Ireland; but I trust I have said enough to show that if any tourist likes to add Entomology to his recreations, he will, in any of the districts to which love of scenery may lead him, find there is a pleasure to which otherwise he would have been a stranger.

THE END.

THE SUBSTITUTE;

OR,

Entomological Exchange Facilitator, and Entomologist's
Fire-side Companion,

FOR

1856—7.

Alere flammam.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 1.] SATURDAY, OCTOBER 25, 1856. [PRICE 2d.

THE SUBSTITUTE.

"THE Substitute for what?" So asks some reader of our title who has not seen 'The Entomologist's Weekly Intelligencer,' in which our advent was announced. We may be wrong—we hope we are; there may not be one entomologist that is not aware of the fact that we are appointed the *locum tenens* of the 'Intelligencer' until that luminary shall again appear on the horizon. The light our predecessor shed was, perhaps, small and flickering, as became so modest a satellite; still it was light, and our endeavour will be to keep up the glow while that little star is out of sight. This is our aim and object; but the path we have to tread is, by the force of circumstances, not exactly the same. We shall not have to record captures during the winter, or at least only in a very moderate degree. Now and then we hope some pupa-digger or moss-hunter will give us the results of his experience, and occasionally we trust that others, when looking over the captures of the summer, may find some gem that they overlooked or were unable to determine, at the time of capture, and tell us all about it. We wish to have more than this. Almost every collector has, during the summer, taken specimens of insects which he does not require

for his collection, and which he would be glad to give away to any one that wanted them. Many, perhaps all of them, are common, either generally or locally: no matter; there are always young collectors to whom such things are prizes, and the gift of duplicates may be the means of establishing them as collectors for life. We say *gift* advisedly; for although every one should make whatever return he can for specimens sent, yet the proper spirit is not to expect any return at all. We are sure that, in the long run, those who give the most liberally receive the most, often from sources the least thought of. We hate the *quid pro quo* system, although it would be well, as has been observed to us, if at times collectors would remember when they expect a rarity, and have something which they might send, to do so. From the old collectors we should like to see lists of insects for distribution, specimens that they have had by them perhaps for years, simply for want of knowing what to do with them. There must be many in this position; and we take it that it would be a real relief to get rid of what is to them so much lumber, and yet to others of priceless value. Well, all that collectors, whether givers or receivers, have to do, is to send us their lists: we will print them and distribute them: the trouble

is not much; it need only be done once, and we shall thus be the "Substitute" for lots of letters.

Visits to remarkable places, recollections of the past, and anticipations of the future will, we hope, form the subjects of some articles for the fire-side reading of our friends; and if any of our correspondents will send us such, or any weightier matter, we shall be happy to find room; indeed, at present we are not inclined to say what we should reject.

Finally, we beg to remark that 'The Substitute' is for the benefit of entomologists themselves, and it will be whatever they choose to make it. Of our own endeavours we will only say—

"'Tis not in mortals to command
success;
But we'll do more, Horatio, we'll
deserve it."

We are credibly informed that a lot of foreign *Phlogophora empyrea* have been imported into Brighton for distribution as British specimens. If such a fraud be attempted we will publish the names of the culprits as a warning to others. We have reason to believe that foreign insects have been passed off as British by other parties, and we shall be only too glad to put a stop to such disgraceful proceedings.

We have before us the names of the members of the Sheffield Entomological Society, of which Mr. William Shelden is President, and Mr. Francis Bradley is Secretary. We are happy to hear of the existence of such local associations, which, if amicably conducted, have much better oppor-

tunities of investigating the entomology of a district than a single resident or visitor. We hope to hear something of the doings of the Sheffield Society, which has only just emerged into light, although it was instituted in 1843.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in postage stamps to the publisher.

DUPLICATES AND DESIDERATA.

Glass Tubes in Exchange for Lepidoptera.—I am a manufacturer of glass tubes suitable for the preservation of larvæ (I enclose one which has been three years in the tube). My object in addressing you is that I am forming a cabinet of Lepidoptera, and shall be happy in exchange for insects to forward glass tubes, as I have not a stock of insects that I could part with at present, and I do not wish any one to part with theirs without some return, and as this is the right season for larvæ

I think my offer may be opportune.—HENRY BAKER, 90, *Hatton Garden*; September 23, 1856.

Larvæ of Lasiocampa Rubi, &c., to spare.—During the last week I have taken larvæ of *Lasiocampa Rubi*, of which I shall have a quantity to spare. I have also a few duplicates of *Argynnis Aglaia* and *Abraxas ulmaria*. I am in want of the following:—

Pamphila Comma,
Erebia Cassiope,
Liparis Monacha,
Choerocampa Porcellus,

or any species of *Trochilium*.—T. CAMPBELL, *Congreve Street, Birmingham*; September 22, 1856.

Lepidoptera wanted.—I beg pardon for trespassing on your time, but I must inform you that I am a working man, and a new beginner in Entomology, and the information I want is where I can purchase a few of the following:

—*Sphinx Convolvuli*, Kentish Glory, Humming Bird Sphinx, Wood Leopard, Goat, Black Arches, Fox, Dark Tussock, Bath White, *T. Alveolus*, *S. Paniscus*.

—JOHN COXON, *Sun Place, Sodom, Holbeck, near Leeds*; September 23, 1856.

[We do not recommend you to buy at all; wait a while, and you will probably take them yourself, or some one may give them to you. A collection is not to be made at once.]

Mr. Proctor's List of Duplicates and Desiderata.

DUPLICATES.

Colias Edusa,
Melitæa Artemis,
Argynnis Euphrosyne,
„ Selene,
„ Aglaia,
Vanessa C-Album,

Cynthia cardui,
Satyrus Ægeria,
„ Megæra,
„ Semele,
„ Tithonus,
„ Hyperanthus,
Polyommatus argiolus,
„ Artaxerxes,
„ salmaceis,
„ Alsus,
Erebia Blandina,
Thanaos Tages,
Smerinthus Populi,
Anthrocera Lonicerae,
„ Filipendulæ,
Procris statice,
Euchelia Jacobææ,
Callimorpha Dominula,
Euthemonia Plantaginis,
Porthesia monacha,
Orgyia fascelina,
Phragmatobia lubricipeda,
Eriogaster lanestris,
Lasiocampa Roboris,
„ Trifolii,
Odonestis potatoria,
Saturnia pavonia-minor,
Hepialus sylvinus,
Cilix spinula,
Notodonta carmelina,
„ dictæa,
Diloba cæruleocephala,
Pygæa bucephala,
Acronycta Psi,
Polia chi,
„ nebulosa,
„ flavocincta,
Mamestra oleracea,
Orthosia pistacina,
Ceraapteryx graminis,
Agrotis valligera,
Graphiphora plecta,
Tæniocampa gothica,
Agrotis putris,
Lemuris Typica,
Thyatira derasa,
Scoliopteryx libatrix,
Scopelosoma satellitia,

Orbona rufina,
 Lytæa umbrosa,
 Caradrina glareosa,
 Calocampa exoleta,
 Euperia trapezina,
 Gortyna flavago,
 Cucullia umbratica,
 Plusia chrysitis,
 Hydræcia nictitans,
 Ceratopacha diluta,
 Phytometra ænea,
 Mania maura,
 Euclidia Mi,
 Himera pennaria,
 Crocallis elinquaria,
 Odontopera bidentaria,
 Ennomos illunaria,
 Larentia bipunctaria,
 Anaitis plagiaria,
 Chesias spartiaria,
 Abraxas ulmaria,
 Strenia clathraria,
 Acidalia Blomeraria,
 Hydrocampa Nymphæata,
 Pyrausta punicealis,
 Eurrhpara urticata,
 Botys verticalis,
 Scopula olivalis,
 Pionea margaritalis,
 Halias prasinana,
 Yponomeuta padella,

DESIDERATA.

Nemeobius lucina,
 Argynnis Adippe,
 „ Paphia,
 Vanessa polychloros,
 Apatura Iris,
 Limenitis Camilla,
 Thecla Betulæ,
 „ Pruni,
 „ Rubi,
 „ Quercus,
 „ W-Album,
 Polyommatus Corydon,
 „ Adonis,
 „ Argus,
 „ Acis,
 Steropes paniscus,

Pamphila comma,
 „ Actæon,
 Choerocampa Porcellus,
 „ Elpenor,
 „ Celerio,
 „ Nerii,
 Sphinx Convolvuli,
 „ Ligustri,
 Smerinthus Tiliæ,
 „ ocellatus,
 Any of the Trochilium,
 Cossus ligniperda,
 Zeuzera Æsculi,
 „ arundinis,
 Lasiocampa rubi,
 Notodonta Ziczac,
 Clostera curtula,
 Liparis Salicis,
 Euthemonia russula,
 Lithosia miniata,
 „ quadra,
 Arctia villica,
 Leucania turca,
 Apatela leporina,
 Acronycta aceris,
 Diptera Orion,
 Catocala promissa,
 „ sponsa,
 Brepheos Parthenias,
 „ Notha,
 Euclidia glyphica,
 Phigalia pilosaria,
 Nyssia hispidaria,
 „ zonaria,
 Biston hirtaria,
 Angerona prunaria,
 Aspilates citraria,
 „ gilvaria,
 Hydrocampa potomogalis,
 Stenopteryx hybridalis,
 Agdistes Bennettii,
 Pterophorus Pentadactylus,
 „ Spilodactylus,
 Alucita polydactyla.

—WILLIAM PROCTOR, JUN., *Durham*; October 6, 1856.

The 40-Thecla Betulæ.—I regret to say that all my good dupli-

cates of *Betulae* are disposed of. It was a butterfly that most of my collecting acquaintances wanted. I have had so many applications that I hope my correspondents will excuse me not answering each separately.—WM. HENRY DRAPEL, *Chichester*.

CAPTURES.

Carabus intricatus.—I found a specimen of this rare beetle on the 9th of the present month among grass on the edge of a pathway in one of our Devonshire Woods: it had either been trodden upon or wounded by a bird, as one of the segments of the abdomen was broken, but otherwise it is a perfect specimen.—J. J. READING, 42, *Gibbons Street, Plymouth*; September 22, 1856.

Sphinx Convolvuli.—A rubbed female was taken in a house in the middle of Plymouth on the 12th September.—IBID.

Acherontia Atropos.—I took a fine male specimen of this insect on the 19th inst., whilst beating elder-bushes for caterpillars, on a garden-hedge in Silverwell Lane.—FINLEY FRASER, *Bolton-le-Moors*; September 23, 1856.

Larva of Acherontia Atropos.—I had a larva of *Acherontia Atropos* brought to me two or three days ago by a gentleman who caught it at St. Lawrence. It is about to change.—R. F. TURNBULL, 4, *Chatham Place, Ramsgate*; September 22, 1856.

Plutella annulatella.—I took one specimen of this species whilst out "prospecting," near Conway, with Mr. Langecake. It was sitting on the bare rock which faces

the sea on Bangor New Road, about two miles from Conway, September 4th. Collectors in the neighbourhood should look for it a month earlier.—C. S. GREGSON, *Stanley, near Liverpool*, September 21, 1856.

Phlogophora Empyrea.—This species has again appeared in this neighbourhood, and has been very closely sought after. I am happy to say that my friends Messrs. E. and G. Egles, of 32, Park Crescent (who discovered the species last season), have taken five specimens, and I have been still more fortunate, having succeeded in taking fifteen. These, together with one which has been taken by Mr. Thorncroft, of North Lane, are all the British specimens that have come under my notice, but I am told there are plenty of foreign ones in the town.—H. COOKE, 8, *Pelham Terrace, Brighton*; October 14, 1856.

COMMUNICATIONS.

Larva of Leiocampa Dictæa.—I one day took fifty brown and green larvæ from the birch, fed them on birch exclusively, and reared six perfect moths from that number, all *L. Dictæa*. The information may appear trifling; but if trifles be not observed we cannot acquire a knowledge of the habits and manners of larvæ.—RICHARD CARTMEL, 13, *Williams Grove, High Park, Walworth*; September 23, 1856.

Larvæ of Leiocampa Dictæa and Dictæoides.—The only larvæ of *Dictæa* that I have taken in this neighbourhood were olive-brown or drab, each segment of various

shades, and appearing more rounded and distinct than in *Dictæoides*. The yellow stripe at the side of *Dictæoides* is not a constant character. I have taken specimens this year in which it was entirely wanting, and some in which it was interrupted. Has any one met with such?—T. CHAPMAN, *Bothwell Street, Glasgow*; October 11, 1856.

Larva of Apatela Leporina.—I have a caterpillar of *Apatela Leporina* covered with bright yellow hairs; a Yellow Miller. As most authors say the Miller should have a white coat, how has my specimen got a yellow one?—IBID.

[The colour varies in different specimens.]

Food of the Lithosiæ larvæ.—Respecting the food of these larvæ, I may state that last spring I reared a good many specimens of *L. rubricollis* from larvæ found early in the previous autumn. I fed these larvæ with moss off the trees, not lichens, and I saw them eat it. However, I dare say they might have preferred lichens, for they did not all feed up. As there is an idea that the larvæ hibernate, it is worthy of remark that all my larvæ that turned to pupæ did so in the autumn. Last spring I had a larva of what I believe was *L. aureola*, which fed for some weeks on sallow, but it subsequently died from being bottled up too tightly.—REV. WILLIAM HENRY HAWKER, *Horndean, Hants*; September 20, 1856.

Food of the Lithosiæ larvæ.—I think you are perfectly right in feeling sceptical as to the circumstance mentioned by me of the larva of *L. Griseola* feeding upon

plantain. I am well aware that the *Lithosiæ* feed upon lichens, and you are therefore quite justified in asking confirmation of such an aberration from their usual habits. You may, however, rely upon the fact being as I have stated it. When I found the larvæ at Halton I was a comparatively inexperienced collector. They were crawling on the ground, near the roots of a poplar. Not knowing what they were, and ignorant of their food, I put them into a box by themselves; and imagining, from the circumstance of their being on the ground, that they fed on low-growing plants, I gave them plantain, which they readily ate. There was no other larva in the box.—REV. J. GREENE, *Playford, Ipswich*; September 22, 1856.

Notice! Stray Boxes.—Eight or nine boxes of mine being in the hands of as many entomologists in various parts of the country, this is to give notice that the undersigned will feel much obliged by their being returned when quite convenient to the present possessors.—IBID.

Hunt for the Eggs.—Your kind insertion of my stray observations in the 'Intelligencer' induces me to express a hope that you will exhort your friends, during your hibernation, to turn egg-hunters. This is my plan for *Plumigera* and several other species. It beats pupa-hunting out of the field for a winter morning's walk. It requires no stooping and no tools, except a penknife to cut off portions of bark containing eggs. The sight of a spray of maple, with a dozen eggs of *Plumigera* sprinkled up and down it, is

attractive to other eyes besides tom-tit's.—REV. B. SMITH, *Marlow*; September 22, 1856.

Is Acronycta Salicis a species?
—I may be about to tread on somebody's corns; and if people will grow such things they may expect to find them painful at times, especially when a clumsy Lancashire chap treads on them. At page 183 in Mr. Stainton's 'Manual,' I see he has copied an error from Guenée's great work, which the latter author was led into by Curtis. The larva figured along with the imago of *Salicis* in the splendid work of Curtis is the larvæ of *Menyanthes*, as every Lancashire collector knows. I have had hundreds of them, but never reared *Salicis* from them. Both myself and my friend Mr. Greening have, however, reared *Salicis* from the larva of *Rumicis*, and are perfectly satisfied that it is nothing more than a dark variety of the latter species.—NICHOLAS COOKE, 6, *Wentworth Street, Everton, Liverpool*; October 8, 1856.

List for Labelling.—I have had printed on one side, for labelling, a list of British Lepidoptera, with the generic name prefixed to each species. It contains 1188 species, containing the *Macro-Lepidoptera*, *Tortricina* and *Crambina*. I shall be glad to send a specimen to any entomologist who wishes it, or a complete copy on receipt of eighteen stamps. I think it will be found a useful list by beginners. I have still plenty of exchange lists on hand, which I will send to any one at the rate of one shilling a dozen, post free. It contains 1100 species.—T. CHAP-

MAN, *Bothwell Street, Glasgow*; October 11, 1856.

Holbeck Feast.—The members of the Holbeck Entomological Society will feel obliged by the insertion of the enclosed paragraph. —“This feast commenced on Monday, with its usual amount of attractions. The most interesting “sight” got up for the visitors is that of the “Holbeck Entomological Society,” (a society composed entirely of working men), who have collected together in the School, at the end of the Moor, upwards of twenty thousand rare specimens of birds, butterflies insects, &c. The whole are arranged in a manner which gives pleasing evidence that the working classes can cultivate a taste for the beautiful when an opportunity offers itself. Amongst the specimens exhibited is a fine living locust, which was caught by one of the members a few days ago near Armley. The exhibition is open every evening during the week, and it has been, so far, well attended.”—JOHN U. WIGNALL, Secretary, *Holbeck*; September 27, 1856.

The collection of Insects in the British Museum.—How is it that the collection of insects in the British Museum is so meagre? I wanted to find the names of a number of insects I had with me, and could not find them, or if they were there they were so faded that I could not recognise them. The Emeralds, for instance, were white, and the Carpets were much changed. I think there is no excuse for not having a complete collection visible to the public, particularly as the science of En-

tomology is popular and interesting, and numbers of persons go there for the same purpose that I did.—H. B.

[All students can have access to the general collection in the Museum, one of the finest in the world, and they will meet with attention from the officers. Ask for the insect-room next time you go.]

The destruction of Wasps.—I am induced to communicate to you the method I have followed to reduce the number of wasps. It is well understood that it is useless to war against nature; still, by a little trouble we can keep different pests (as we call them) within bounds, in addition to the excellent plan of the Rev. J. S. Henslow. There must be many nests not discoverable every season. It is well known to those who study the science of insects, that the last young wasps that leave the nest are male and female (queens) only. Some few seasons back I observed, in the autumn, that a vast many of this tribe resorted daily to a giant Fennel plant, *Ferula* in botany, and that the whole of them were male and young queens; only it struck me that if I used the *Tinea* net to entrap the females, I should greatly reduce their number the following season. The males, as you know, have long horns, and do not sting, so that any gardener, unedified in insect lore, might greatly reduce the enemies to his wall-fruit, and save his ripe gooseberries—the titbit of the tribe. He would be sure to destroy fifty or sixty queens by his perseverance daily, with this little trouble. If this is of any use to you, or your readers, you are wel-

come to make it known.—THOS. FORDHAM, *Snelsmore Hill East, Newbury, Berks; September 27, 1856.*

Notice.—I understand that it is well known that a considerable number of foreign specimens of *Empyrea*, *Alniaria* and *Erythrocephala* have been introduced into this town, and will probably be shortly palmed off as genuine British specimens. I thought that by making this publicly known I might put purchasers of insects on their guard. The only specimens of *Empyrea* that I have heard of having been captured in this country this season, were taken by Mr. Cooke, Mr. Egles, and one by Mr. Thornecroft.—JOHN N. WINTER, 28, *Montpelier Road, Brighton; October 15, 1856.*

Notes by an Old Collector.—In this month's 'Manual of British Butterflies and Moths,' Carlisle is mentioned as a locality for many insects. Years gone by I was a resident of that town, and an ardent collector of larvæ; and in this paper I purpose naming the quarter where I captured the larvæ of some of the moths named, in the hope that collectors will not allow places of like character to escape their notice when searching for caterpillars. The ground to the north of Carlisle is open and bleak, portions of which are known by the name of "Mosses," with the name of the parish in which the moss is situated prefixed. They all possess the same distinctive features, the surface is plentifully covered with heather, and various species of birch, poplar, willow, alder, oak and shrubs here and there stud the ground. Amongst the heather and moss I

have taken the larva of the Emperor and Fox, *Lasiocampa Quercus* and *Anarta Myrtilli*, moths, and from the trees and bushes the Dark, the Pale, the Pebble, and Cockscomb Prominents, the Miller, *Leiocampa Dictæa*, the Chocolate Tips, the Puss, the Kittens, and the Dromedary; but to go on enumerating would be to name hundreds of different species which I have captured, or seen captured, on the mosses, and in the fields and woods surrounding Carlisle (more especially Barren Wood, of which more anon). I do not believe in the localization of a moth, in the sense in which that term is applied to moths. I am of opinion that the same species of moths may be found all over England where the same aspect of country prevails. A moth, in the course of an evening, will fly miles, constantly shifting and changing its quarters for the purpose of finding a proper support for its progeny, not depositing too many eggs in one place, so that some may survive the destruction incidental to caterpillars. If, in the course of its search, a moth crosses a country that is congenial to the growth of its caterpillar, it will deposit some of its eggs there, concealing itself through the day, and continuing its duties in the evening, but it will not deposit its eggs where there is not food for its caterpillar. Would a Silkworm Moth deposit its egg on the oak? Neither will a Cabbage Butterfly. Some time ago I read a statement, by a reverend gentleman, that he had put a lighted candle near his window, leaving the window open, and that a moth entered the room, being attracted

by the light; and as the moth was only taken in woods, and the nearest wood to his house was a mile off, the inference drawn by the entomologist was, that the light of his candle had attracted that moth a mile. I do not come to the conclusion that it was in consequence of the light that the moth left its natal wood; it is much more probable that the moth was roving in search of some tree or wood similar to its native place to deposit its egg, so that the longevity of some of its brood might be secured, and thus it came across his light when perhaps only a few yards off; if it was a male moth it makes no difference to my supposition, because the male seeks the female on the wing, and where the female goes the male will follow. I will illustrate my position, viz., that there is no localization in the strict sense of the word in reference to moths, and that the same species of moth may be found all over England where food and shelter are favourable to the growth and due development of its caterpillar. —RICHARD CARTMEL, 13, *Williams Grove, High Park, Walworth*; July 21, 1856.

[To be continued.]

EXTRACTS.

NOTES ON NOCTUÆ, FROM
'L'HISTOIRE NATURELLE DES
NOCTUELITES,' PAR ACHILLE
GUENÉE.

Bryophila.

The larvæ of *Bryophila* are easily recognised. They are contracted; the head is small, retractile, shining or slightly rough;

the ordinary spots are warty, always raised, often shining, and as it were metallic; each only bears a single hair, which is, however, visible enough, though short. They feed exclusively on the lichens which grow on trees or on rocks, and like all other lichenivorous larvæ they only take their meals when the lichen is moist with dew. As soon as the sun has attained any height they hasten to regain their places of shelter. Those which feed on the lichens of trees retire among the bark or under the shelter of the branches; but those which are situated on stone walls would not thus find a sufficient shelter from the heat, consequently they spin in the cavities or little crinks of the wall, small cocoons, which they consolidate with pieces of lichen and mortar, and through which they make a hole to serve as a passage of egress. When ready for their transformation they construct a new cocoon, which they cover so cleverly with fragments of wall that I have seen on well-hewn stones, which appeared quite smooth, as many as ten to a dozen of these cocoons, which it was impossible to distinguish at the first glance, and to discover the whole of which required several hours.

The *Bryophilæ*, in the perfect state, are small insects with slender bodies: their wings are varied with brown, whitish and green, and imitate, in some degree, the lichens on which the larvæ have fed, on which the insects repose quietly during the day, and are almost as hard to be distinguished as their cocoons. The object of these singular resemblances is

easily divined, and nature has multiplied them in a thousand analogous circumstances, evidently in order to give defenceless insects the chance of escaping from enemies of all sorts. (Vol. I., p. 22.)

Acronycta.

Of all the genera of the Noctuæ this is certainly that in which there is the greatest diversity among the larvæ; yet the differences consist principally of the greater or less development of the trapezoidal warty spots. Thus, whilst in *Auricoma*, *Menyanthidis* and *Rumicis*, these are elevated into a hemispherical form, and furnished with tufts of hair, as in the *Chelonidæ*, they are much reduced in size, and flattened in other species, till, as in *Ligustri*, they only form small dots, hardly raised at all. The nature of the hairs also, with which they are clothed, varies considerably. Long and silky, though scattered, in *Psi*, *Tridens*, &c., they become thick and disposed in long diverging tufts in *Aceris*; they cover the entire surface of the caterpillar in *Leporina*; they are reduced to short brushes in *Rumicis*; in *Megacephala* there are only a few hairs; in *Ligustri* only one proceeds from each spot; and in *Alni* these hairs are swollen at the tip so as to appear clubbed. Yet the length of the hairs and the size of the trapezoidal warts are not the only variations we observe in this singular genus; even the form of the larvæ undergoes considerable modifications. Thus, whilst a large number are cylindrical, only a little flattened beneath, without any eminence, some, such as *Psi*, *Tridens* and

Cuspis, bear considerable humps on the fourth and twelfth segments; in some the head is small, and the anterior segments much attenuated (*Strigosa*, *Ligustri*), whilst in *Megacephala* the head and neck are disproportionably large. These modifications, however, do not correspond with the *facies* of the perfect insects, and the genera *Apatela* and *Semaphora*, which we used to separate from the larger genus *Acronycta*, have been completely upset by an investigation of the exotic species. The larvæ of *Acronycta* feed on all sorts of plants, and in all seasons, though principally in autumn: they remain always exposed, not seeking any shelter, and are easily found: they are generally rather sluggish. The perfect insects do not differ in their habits from other *Noctuæ*: they are often found at rest on the trunks of trees, near the spot where they have emerged from the pupa state. The species of this genus are closely allied; and it is necessary to observe the transformations with great care to separate species which are really distinct, and to unite the numerous varieties which have been named as distinct species by various authors. (Vol. I., pp. 41, 42.)

Anthrocera Minos.—I left Dublin on the 17th June, and took up my head quarters at Kinvara, a seaport town in the county of Galway, not many miles from Gort, and minutely examined all the ground between Kinvara and Tyrone for two days without meeting a single specimen of *Anthrocera*. At the beginning of my third days' search it became quite ap-

parent I was not in the proper locality, and I determined to go to Ardrahan at once. I spent the better part of a day there without the smallest success; but on my way back to Kinvara I entered a large field, which was overgrown with *Arctostaphylos Uva-Ursi*, *Dryas octopetala*, *Sesleria cærulea*, *Gentiana verna*, and other plants, and, while stooping to gather the pretty *Dryas octopetala*, an *A. Minos* alighted quite passively on the flower. All my disappointment was now over, for in the brief space of three or four hours I collected a very fair stock of specimens. I observed that wherever *A. Minos* was to be found, there the plants that I have particularised were to be found also. One of its chief food-plants is *Polygala vulgaris* (the *Anthrocera* is called *Polygalæ* by Borkhausen), and this plant grows in the greatest abundance in all the fields here, and it seemed to be fed upon by its larvæ. At the same time, it is most probable that it feeds on various other plants, as, if we can judge from Schiffermüller and Denis's account, it would not seem to be very particular. "The caterpillar," say these authors, "feed on clover (*Trifolium*), *Veronica officinalis*, *Briza minor*, *Cynosurus cristatus*, *Gentista tinctoria*, and *Thymus Serpyllum*; it is like that of a *Scabiosæ*, but is pale yellow (not golden yellow as that), with two rows of twelve black spots. The cocoon is very convex, and of a brownish yellow colour; the pupa black-brown on the head, wing sheaths, and back, elsewhere yellowish. The fly appears in three weeks, and is on the wing from the end of June to

August in most parts of the continent of Europe." It appears about a fortnight earlier than *A. Filipendulæ*: at least, a dozen of the cocoons of the latter changed about fifteen days after I first took *Minos*, and with one solitary exception *Minos* was the only *Anthrocera* I saw while in Galway.—*Communicated by Mr. Percival Wright to the "Dublin University Zoological Association."*—*Natural History Review.*

TO ENTOMOLOGISTS. —

Mr. FOXCROFT begs to return his sincere thanks to the Trustees of the British Museum, the Nobility, Gentry, and Clergy, and also particularly to the Members of the Entomological Society, for the patronage he has received for a number of years, and takes the liberty of informing them and others that he intends making another journey into Scotland for the purpose of discovering what insects he can catch in the neighbourhoods of Balmoral and Castle-town in the summer of 1857, commencing from the 1st May till the end of September, and to enable him to carry out this plan he wishes to raise a sufficient sum by subscriptions of £1 3s., each subscriber to receive two specimens of all kinds of Lepidoptera that may be captured during the season, and box.

Persons subscribing for Coleoptera, subscription will be £1 3s. for two species of all kinds of Coleoptera that may be captured during the season, and box, the whole of the Insects to be shared on the 1st of October, and sent to the subscribers.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

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CHANGE OF NAMES.

“WHAT’S in a name? A rose by any other name would smell as sweet.” This may be a true sentiment in many senses and on many occasions, but it is one the entomologist abhors. Without names insects become of little account to him, and, as Linnæus has said, “without names the knowledge of things perishes.” To the unscientific entomologist, the maker of a collection, the change of names constantly going on produces the same effect as if the insects had no names at all. One name is to him as good as another; and he cannot conceive why his old friends should have new titles. It would be better, no doubt, if we could so accumulate our knowledge that a name once given should stand for ever, but from the very conditions of our existence such prescient power can never be ours. We have no wish to justify all modern changes of nomenclature; yet something must be conceded to the necessity which the discovery of an immense number of species has laid upon scientific entomologists to class the additions under new generic heads, rather than to cram them under the old ones, which did well enough for the species known when they were instituted, but which cannot, with any propriety, be made to cover the variations of

structure since made familiar to us.

Unfortunately there is no canon for the construction of genera, arising out of a knowledge of the system of nature, so absolute that it must be followed; and so, every author, seeing only a little of the great scheme of creation, more or less according to his elevation, does that which is right in his own eyes, dissects or amalgamates the genera of his predecessors, and in his turn has his work subjected to the same treatment.

The progress of discovery, or the extension of our knowledge, having made necessary the multiplication of genera, all that we should insist upon is that they are not founded upon trivial differences, and that where nature has joined species together they should not be put asunder. A new generic name is bad enough for the unlearned, but the change of specific names is the most annoying; yet when it arises from the principle of the restitution of an old name, that principle is so sound that whatever temporary inconvenience may be caused to the multitude, who do not care to know the reason why, it must be upheld. But where the change is merely on account of some crotchet or individual dogma, it ought to be opposed as needlessly embarrassing both to scientific and unscientific men. There are already existing

quite sufficient difficulties, in the way of the adoption of a universal nomenclature, without adding new ones.

We have been led to this subject by an article in 'The Natural History Review' on the 'Manual of British Butterflies and Moths,' in which the writer is wrath with Mr. Stainton for departing from the generic arrangement adopted in Mr. H. Doubleday's List of British Lepidoptera, and demanding the reason. It seems to us that the reason is contained in the characters laid down for the genera: they may or may not be sufficient—that is another question—but there they are. We have our own opinion about the matter, but it is founded upon data widely different from those of the reviewer, who, as a specimen, gives his own reasons for keeping the genus *Lithosia* of Doubleday intact, namely, "that all the larvæ are lichen-feeders, all the insects (all at least we have met with) lie, when at rest, with the wings folded round the body, and in general form and appearance closely resemble each other." One who sets up as a judge of others, and can himself do no better than this, had better abdicate the judgment seat as soon as possible. We do not go into the merits of the 'Manual' at all; it is evident that the changes set forth are held to be objectionable whether they are right or wrong, simply because they are changes. To such persons as our reviewer represents science and system are quite supplementary; to possess a collection of insects, with names, is everything. It may be something new to the reviewer to hear

that a list, such as that he alludes to, without characters of genera or descriptions of species, is no authority at all for quotation, that to be the first of British Lepidopterists is not to be "the first of British entomologists," and that a 'Manual of Moths and Butterflies' is not a Manual of Entomology. We may again revert to this subject.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in postage stamps to the publisher.

T. CHAPMAN.—List received with thanks.

DUPLICATES AND DESIDERATA.

Duplicate Lepidoptera.—I have a few fine specimens for exchange of *Cosmia fulvago*, *Luperina connexa*, *Pyrophila pyramidea*, &c., &c.—WILLIAM RODGERS, Gardener, Moorgate Grove, Rotherham; October 17, 1856.

CAPTURES.

Sphinx Convolvuli.—At Crediton, on the 15th September, 1855, I caught a splendid female specimen of *Sphinx Convolvuli* flying before the flowers of the honey-suckle.—G. F. MATHEWS, *Raleigh House, Pilton, near Barnstaple*; October 10, 1856.

Colymbetes fuscus.—When I was walking on Blackbeath yesterday I saw a beetle fly into a little water in the road. I showed it to papa, who said it was *Colymbetes fuscus*, a water-beetle he had never seen fly.—LAURA A. DOUGLAS, 6, *Kingswood Place, Lee*; October 13, 1856.

Larvæ near Rotherham in September.—By kind permission of the proprietors of an extensive nursery I set to work in good earnest about nine o'clock one morning, and by three in the afternoon had the pleasure of bagging the following game:—*Apatele leporina*, *Acronycta Alni*, *Smerinthus Populi*, *Biston Betularia*, *Cerura bifida*, *Leiocampa dictæa*, both kinds of larvæ, green and brown, and for the first time *Leiocampa Dictæoides*. Most of the larvæ I found upon *Populus nigra*, *P. tremula*, and *Betula alba*.—WILLIAM RODGERS, Gardener, *Moorgate Grove, Rotherham*; October 17, 1856.

Nepticula Septembrella.—On the 19th inst., at the side of one of the paths in Darenth Wood, I found a few plants of *Hypericum*, of which it is no exaggeration to say that every leaf was tenanted by a larva of *Nepticula Septembrella*. These larvæ were in all stages of growth, the mines varying in size from the merest indication

to the great discoloured final blotch. A search now of the *Hypericum* plants, in sheltered situations, would reward any one who would look for these larvæ.—J. W. DOUGLAS, *Lee*; October 22, 1856.

COMMUNICATIONS.

[Continued from p. 9.]

Notes by an Old Collector.—I passed the "Jolly Sailor," near the Croydon railway line, in company with a brother collector named David Edwards: we went under the arch of the railway and turned to the right, crossing the fields towards Croydon, and leaving the railway on our right hand, we came to a portion of the remains of the Croydon canal. On the left side of the canal stood a bush of the willow. I said to my friend, look out for the larva of Kittens to-day, this region is highly favourable for their growth; here is a willow; from similar ones in Cumberland I have obtained scores. I struck the bush, and two beautiful caterpillars of *Cerura furcula* came into my inverted umbrella. We proceeded onwards and Mr. Edwards captured some, and I got three more. I was a quarter of an hour one day in the Wood, that stood in front of the Crystal Palace, at Norwood, and I captured the larva of the *Notodonta Dromedarius*, *N. Ziczac*, *Cerura furcula*, and *Pterostoma palpina*. I expected to find them, and did so, because I had obtained them from a similar situation in Cumberland, and so I should expect to find the same species of moth under the conditions requisite. Going along

the hills, between Croydon and Addington, I took the caterpillars of the Emperor Moth off the heather: it is a common insect on the mosses round Carlisle. Although (from a circumstance which I shall narrate) I am inclined to think that twenty years ago it was not known as a native of Cumberland. I was on Bowness Flow, a moss about fourteen miles from Carlisle, playfully tapping the tops of a heath bush with my stick, when the prettiest caterpillar I had then seen rolled to my feet: I was in ecstasies, boxed my prize, with a bunch of heather as food for my prisoner. In course of time my caterpillar underwent his transformation, and emerged from his cocoon a splendid male Emperor Moth. Subsequently I have taken as many as twelve caterpillars in one day, and have found them on all the mosses round Carlisle. I will relate a little gossip respecting the Emperor. My informant (now no more), a worthy man, with whom I have traversed the fields scores of miles,—Mr. Mark Noble, of Carlisle,—was looking for larvæ on Solway Flow, a moss about ten miles north of Carlisle, when he captured a female Emperor Moth: he put a pin through its thorax and stuck it in the crown of his hat. Being a hot day, and getting somewhat tired, he sat down on a stone and put his hat on the ground. At this time there was nothing to be seen flying. Presently a male Emperor came “bobbing around” the hat, then another, and another, until he counted six male Emperors flying round him at one time. Now, says Mr. Noble, they could not see through my hat, nor

inside of it, until they were flying over it; therefore, the deduction is that they smelled their captive mate in the hat, and thus were sympathising with her forlorn condition.

In searching for larvæ, when entering a field, I commence at a corner and go round the field, beating every bush and tree I come to, and with every new caterpillar I capture I put a leaf of the plant on which it was feeding in my box, so that I always know what food to give. From some birch trees that were growing in a hedge on the Kingmoor estate, near Carlisle, I obtained about thirty caterpillars of the *Leio-campa Dictæa* and *Dictæoides*. I took about twenty more that year from the birches on Houghton Moss, and out of that number I only reared six moths, and they were all the *Dictæa*. In other years I obtained both kinds of caterpillars, but could never rear a *Dictæoides*. There is no mistaking the difference in the caterpillars of the *Dictæa* and *Dictæoides*—the yellow line on its sides. But are they not male and female of the same moth? I tried for eight years to rear a *Dictæoides*, and failed, although I have had as many caterpillars of one as the other, and got them full grown in September, and as late as October. It is a highly sensitive caterpillar. I could not reconcile it to confinement, although I had a box three feet square. I used to tempt them with nice bits of fresh birch from the tree on which I took them, but they would not be persuaded. Those that were ready to change did so as rapidly as possible in order to escape from

their misery, while those that were not ready would stick on the branches pining after their state of nature, until it made you miserable to see them: you could almost fancy they were saying, sooner than be captives we will die first, which they did.—RICHD. CARTMEL, 13, *Williams Grove, High Park, Walworth*; July 21, 1856.

A Beginner's List of Butterflies, &c., observed at Bisterne, Ringwood, Hants, from October 15, 1855, to October 15, 1856, being his First Year of Observation.

G. Rhamni.—February 9, middle of June. New brood, July 22. Was last seen in 1855 on November 6, so that it is the latest as well as the earliest of our butterflies. Although the male appeared February 9, I saw no females until March 28, and then their appearance was so striking, that I was led to the conclusion that either through the gallantry of the males, or the luxuriousness of the females, the former certainly left their winter quarters first, reminding one of the similar circumstance in the arrival of certain birds of passage. According to my short experience, however, the female (among *Lepidoptera*) is generally the first to emerge from pupa; but I observe that in the 'Intelligencer,' the editor remarks the contrary with respect to *A. Paphia*. I found larvæ feeding on suckers of *Rhamnus frangula*, July 10. In the 'Manual' it is described as dark green. It is green, irrorated with black, very similar to that of *P. Rapæ*. A bred specimen was in pupa from July 26 to August 8. This but-

terfly is certainly only single-brooded. What can give rise to any question on this point? They come out from hybernation in much better preservation, and look cleaner than the rest certainly, but I cannot believe in a distinct spring brood. It has a long life; but it is a muscular creature and hardy.

P. Brassicæ.—May 16. Second brood, August 5. These dates I should think are very late. This butterfly does not seem to me to be nearly so common here as in other more cultivated places. I could not breed it; for although I collected about thirty caterpillars, both in October, 1855, and last July, they were all and every one *Ichneumonized*.

P. Rapæ.—April 2. Second brood, July 15; third brood, September 18. Found larvæ in the beginning of July, which were in pupa from July 12 to 25. They have a thin orange dorsal line, not noticed in the 'Manual,' but which is a conspicuous characteristic: one of those found at the end of August remained in pupa from August 25 to September 18, more than a week longer than the preceding brood: the first brood of course was in pupa the whole winter, so that the duration of the pupa state of insects is (as every one knows) quite indefinite, and depending on the temperature of the season: but so also, it would seem, is the number of the broods themselves inconstant, depending on the general temperature of the year.

P. Napi.—April 21. Second brood, July 18. Perhaps the commonest of the genus here, although I did not find the larvæ;

and cannot say whether there was a third brood.

A. Cardamines.—May 27, beginning of July. Not so very common. I met with only a single specimen of the female, and that not till June 27.

[*A. Galathea*.—Not an inhabitant of this neighbourhood. Found it in great plenty at Lulworth, Dorset, August 5.]

L. Ægeria.—April 23. Second brood, June 21; third brood, August 13. I am pretty confident here, also, as to the three broods, having marked the complete disappearance of each of the first two. The third was the most abundant, and lasted till the middle of September.

L. Megæra.—May 11. Second brood, August 1. I suppose the thick bar running obliquely from the middle of the inner margin is (as in *Pamphila* and *H. Tithonus*) indicative of the braver sex, the light ones being female. I saw two of the males fighting, as *A. Iris* is said to do.

H. Semele.—July 3. Seems to enjoy cloudy weather as well as bright.

H. Janira.—June 21.

H. Tithonus.—July 19. Some of the males have the white-centered black spot near the anal angle as well as the females; at least I have one that has these spots, bearing withal the masculine badge.

H. Hyperanthus.—July 10. Does not last nearly so long as either *Janira* or *Semele*, although later in appearance. They were almost gone by August. The last seen (on August 15) was very battered, while *Janira* was looking well on August 26.

C. Pamphilus.—May 30. Another brood, August 26. There is certainly scarce a day, from June to October, when *Pamphilus* may not be seen: he seems to love all summer months, as well as all localities. But I suppose there are several broods; I could only make out two, the first waning by August, and the second lasting till the middle of October.

V. Atalanta.—June 2 to beginning of July. New brood, July 9. I caught *Atalanta* on the 2nd of June in the depths of a wood: it was certainly one that had undergone hibernation. I saw it again on the 10th, 12th, and 18th, always in some wild place. I don't think any of the new brood come out before July 9. Found larvæ on June 21, &c., fourteen days in pupa.

V. Io.—March 26. New brood, July 30. Also exactly a fortnight in pupa.

V. Polychloros.—February 16. New brood, July 24. I have seen several this autumn as well as last. I am inclined to think this a good locality for *Polychloros*. It is a familiar butterfly; hibernated in the house; frequents places of common resort, lanes and gardens, like other *Vanessa*.

V. Urticæ.—March 10. New brood, June 25. I see no ground as yet for supposing that this has more than one brood in the year, although the larvæ leave the egg at different periods, and so caterpillars are seen at the same time of all ages, yet this surely arises from the abundance of the insects, and they are still all of one brood.

A. Paphia.—July 2. A wood near here swarms with this magnificent Fritillary in July, and

exciting sport it is catching them. They even occurred now and then in our garden. I have one specimen of a greenish olive ground colour, with large spots instead of the usual curved streaks. Mr. Stainton kindly informed me that this is probably a female.

A. Adippe.—August 2. A single specimen only was captured; but I have seen other middle-sized Fritillaries about. Missed *Aglaia* altogether.

A. Selene.—June 26. A single specimen.

A. Euphrosyne.—June 6, &c.

M. Artemis.—May 30. In moist meadows. Found a nest of the young larvæ (as I suppose) on August 27, on the leaves of *Scabious*.

Th. Quercus.—July 11. I can corroborate the statement of the larvæ going occasionally underground. A larva, which I shook from an oak on June 9, descended into the earth a few days after, where it remained until July 11, an inch or so below the surface. Saw one flying about an oak as late as August 27.

Th. Rubi.—June 1. Chiefly in our garden. Did not see the second brood.

C. Phlæas.—May 16. Second brood, July 31. I am rather sceptical about the three broods of this insect: I observed a ? in the 'Manual.' The second brood is most abundant.

P. Corydon.—Ah! Corydon, Corydon! *quæ te dementia cepit*—to come into such a sandy desert as Bisterne! Took one on Aug. 4, and found the female at Lulworth.

P. Alexis.—June 3. Second brood, August 2. Very liable to variation.

P. Ægon.—July 2. By far our commonest Blue. *Ægon* and *Semele* (a curious union mythologically) reign together over these heaths in July, and not another butterfly can be seen, if we except Skippers. Hundreds of *Fidonia atomaria* complete the picture.

P. Agestis.—June 15. Second brood not seen.

Th. Alveolus.—May 23. Observed no second brood. Wings in repose erect, ? 'Manual.' I think this query well founded. I have watched the insect by the hour together, and never saw its wings assume an erect position, sunshine or cloud. They always rested horizontally. Just perhaps in the intense heat of the sun the little fellow would slightly raise and lower his wings alternately in "a sort of silent ecstasy," but would never put them bolt upright. When in a pill box, or under the influence of prussic acid, its wings I grant assume a vertical position; but so do the wings of the *Pamphile*, and many small *Geometræ* under similar circumstances.

[*P. Actæon*.—This I obtained on a very delightful trip to Lulworth Cove on a very beautiful day, August 5. The Skipper (a very insignificant looking little fellow) was very abundant, and seemed particularly fond of some yellow thistles; but the sun was exceedingly powerful, and the cliffs dazzlingly white; and so after catching two or three to satisfy myself that it was indeed *Actæon*, I found my eyes aching dreadfully, and my spectacles, and every thing else about me, suffused with perspiration, so, yielding to

the representations of my brother, who accompanied me, and who didn't seem particularly struck with *Actæon's* appearance, I not unwillingly consented to bathe: and to all entomologists fond of a swim in deliciously strong and tinglingly salt water, I would recommend Lulworth Cove. Well, after dining on the cliff we again looked about us. I never saw so many insects together in my life. *Actæon*, *Ægon*, *Galathea* and *Filipendulæ* principally. The flowers were laden with them. I was merciful however, and did not make much of a raid among them. Being but a bad setter of insects, I never kill many, or otherwise perhaps I might have taken some to give away. The characteristic arch of light spots is very indistinct in the male of *Actæon*, but of course its colour and size readily distinguish it from *Linea*. I was rather surprised to find *A. Filipendulæ* in such vast numbers here, when they had long disappeared inland. I observed, however, the same thing with the Red Admiral last autumn. Insects seem to find the benefit of the sea air, and to live longer there, for I can hardly suppose that their coming forth is later. After a second bathe we returned homewards in the balmy evening with great contentment, nothing having occurred to mar the pleasure of the day.]

P. Linea.—July 17.

P. Sylvanus.—June 25. Only one brood. I am very sceptical indeed, in fact an utter infidel, as to the two broods of this Skipper. I saw none (yet looked carefully) before this date, and afterwards observed them continuously into

August. The 'Manual' says one brood in May, the other in August or (p. 64) end of July. According to my observation there were none in May, and they were almost gone by in August; but at the end of June, and throughout July, they were very abundant.

Sphingina.

A. Trifolii.—Turned up twice, July 2 and 15.

A. Filipendulæ.—June 27.

Sm. ocellatus.—Dug out of the earth in our garden under apple-trees, two pupæ of this Hawk, which came out June 5 and 11.

Sm. Populi.—Found two of the larvæ on aspen in our garden, August 22. They were very small: both came to an untimely end.

S. Ligustri.—July 18. Found two of the larvæ on a Privet hedge a mile or two off (the only one I've seen in the country), on August 20 and 22: observed also what I took to be the eggs (empty), about twenty together in an irregular bunch at the tip, chiefly on the under side, of a Privet leaf. I fed them chiefly on lilac, and they went down safely on September 13 and 17. The one first taken was then (August 20) very small, but they feed up with great rapidity.

Ch. Elpenor.—Found four of the larvæ on August 15 in a marshy place, gorgeous fellows, with golden spiracles. Has not the 'Manual' omitted to mention the food-plant, above all others, of this larva, viz., *Galium palustre*. I tried willow-herb and fuchsia in vain, and so had to walk a long way every day to get *Galium palustre*. One of the larvæ was Ichneumonized by a colony of small creatures. The rest spun about

August 21. I found all four on, and feeding on *Galium palustre*.

Ch. Porcellus.—Met with two larvæ, August 4 and 18, both nearly full fed, on *Galium verum*. Both these *Chærocampæ* feed at mid-day, in the hottest sun. The pupa of *Porcellus* has two of the lower segments rasped like that of a wood-eater.

M. Stellatarum.—July 29. I did catch the first and only one I saw.

Bombycina.

H. Hectus.—June 24. Great numbers in a damp copse close to our garden.

H. Lupulinus.—June 22.

H. Humuli.—July 3.

N. Ziczac.—Took larvæ, Aug. 23, on aspen: they were young, and I thought them at first *Geometræ*: spun about September 20.

L. Dictæa.—Took larvæ, Aug. 22, &c., on aspen: they were all green at first, with a red anal tubercle almost of the dimensions of a horn; they all turned to a clayey purple after a while, and the tubercle diminished; they are long larvæ in proportion to their width, and gradually lessen in bulk from the anus to the head. I did not recognize them for *Dictæa* until I read the beautiful descriptions of this and *Dictæoides* in the 'Intelligencer;' Mr. Logan's account especially bringing my own larvæ before my eyes.

L. Camelina.—May 28. Several at light. Found numbers of the larvæ on alder, oak, willow and swallow, in September. They turn up their heads over their backs, in a kind of defensive posture, even more than the larvæ of *Cassinea*.

[*D. Cæruleocephala*.—Larva on

Whitethorn, June 24. Large, bluish white, yellow dorsal and lateral lines, the dorsal line becoming a band on the third segment; black hair-tipped tubercles regularly disposed all over, (four on back and five on each side of each segment); head same colour as body, with two large black dots. Is this *Cæruleocephala*.]

P. Cassinea.—November 12, 1855. One came to light. Larvæ almost plentiful in the beginning of June.

P. Trepida.—Found the larva, July 27, which went into the earth a day or two after without eating. I took it at first for a *Smerinthus* larva, who had by some means got rid of his horn, from the oblique lateral stripes. Mr. Stainton informs me that the name *Trepida* is given to this insect from the larva being supposed to tremble when touched. I did not notice the peculiarity. I thought it a very sluggish creature.

P. Bucephala.—June 8. Larvæ in amazing numbers. Last year they were almost a month later than they are this, so that I took larvæ at the very end of October. Insects were exceedingly abundant in October, and even November, last year; but I can scarcely find any this autumn.

Ps. Monacha.—July 27. Flies slowly at mid-day. I bred one specimen.

D. Pudibunda.—May 16. Bred from larvæ and cocoons taken last October. The young larva (seen this year) is very pale.

O. Antiqua.—Oct. 7. Found a female inside a cow-shed laying her eggs on her cocoon.

[*S. Salicis*.—Do certain yellow-haired pupa skins in cocoons

on the bark and between the leaves of the aspen and willow belong to this moth?]

P. Chrysorrhæa.—Found the larva, which I described at the time as black, with long sandy hairs; interrupted dorsal and lateral lines orange red; at the interruptions quadrate white spots in rows, conspicuous towards the anus. But I omitted to imprison the pupa, and so the moth got among the *auriflua*, and I could not distinguish it.

P. Auriflua.—July 5. Bred in profusion. The minute larvæ, as they appear in autumn and winter (they are five times larger this year than they were last), are exceedingly beautiful. The tails of my perfect *auriflua* are of all shades, from brown to yellow.

L. Stramineola.—August 6. Flies in the evening. Found one by day resting on a Ragwort stem.

L. Complanata, July. *L. Complanula*, July 16. These I confounded until I read the August number of the 'Manual,' so that I cannot say whether *Complanata* is plentiful, but I should think it was, for out of the six I caught for *Complanula* two were *Complanata*. This is a rare place for lichens.

L. Griseola.—June 30. Came to light, &c.

Gn. Rubricollis.—May 17. This is the most abundant Bombyx, I should say, in this neighbourhood. At the end of October, 1855, the larvæ were actively rambling in every direction over the walls of the house and out-houses, and on every log and post in the place. What their food could be was a great puzzle; but many being full fed a good number were reared; and as we found

about fifty pupæ besides (quite accidentally when looking for beetles, we did not dig for them), the insect-room swarmed with them during May and June. The pupæ are generally found in very damp places. But abroad in any day in June! Why the whole place was alive with them, flying in broad day-light (the 'Manual' says all the *Lithosidæ* are evening flyers) everywhere, especially round the tops of trees. Their manner of flight is very peculiar and unmistakable. When attacked they feign death, (so does *Complanula*, and according to 'Manual' *Irrorella*, so I imagine it is a common stratagem with *Lithosidæ*). A considerable number were crippled, although in a state of nature, owing, I presume, to lack of moisture. The soil here is so dry and sandy that many pupæ never come to perfection. This year, again, the larvæ are very abundant, and may be shaken from almost any tree in almost any numbers. The description of the larva in the 'Manual' is hardly satisfactory, as there are no distinct longitudinal lines.

C. Mesomella.—June 24. I suspect that this also is a day insect; but as I saw him fly but a very little way, he might only have been aroused for that period from his slumbers.

H. Dominula.—June 10. Found larvæ, November 5, last year, very small, on *Symphytum officinale*, and again in the spring at the same spot (for they are very local) a great number. Comfrey seems their principal food-plant; they were rarely on anything else; now and then on a nettle.

E. Russula.—June 26. Diur-

nal, and, as the 'Manual' says, fond of fern, &c.; but as fern here is everywhere, so was *Russula*. It also came to light. A correspondent of the 'Intelligencer' remarks this, and particularly notes the hour, 1 A.M., but here they came between 9 and 10 P.M., so that the hour makes no difference.

A. Caia.—July 3. This also came to light.

A. Villica.—June 18. Both these bred from larva.

Ph. Fuliginosa.—May 28. Larvæ abundant in autumn. Can there be a second brood?

Sp. Menthrasti.—May 30. Larvæ abundant in autumn. Came in numbers to light.

Sp. Lubricepeda.—June 21. Not so plentiful as the last. Larvæ spun this year about September 25.

Eu. Cribrum.—June 20. On wing in the evening. Very like a *Lithosia*.

[To be continued.]

EXTRACTS.

SAGACITY OF THE WHITE ANT.
—In nothing is the ingenuity of these little insects more remarkably displayed than in the expedient to which they frequently resort to cross a little stream on the sand beach after a shower of rain. Sometimes their train is cut in two by one of these little streamlets. To plunge into it singly, they would soon be swept away by the rush of the current. They come to the edge of the water, raise their antennæ, point them from one direction to another, as if they were taking a scientific view of all the dangers

of the crossing. They wander up and down the stream with the greatest uneasiness, and finding no other way to cross, form themselves into a compact knot or raft of a dozen or more, and launch themselves upon the stream. They have, by previous observation, made sure that they would strike a projecting point or bluff on the opposite shore, and not be carried by the current into the main river. The moment they touch the other side, they use their claws like anchors, and hold on until the whole company disengage themselves and march off in single file in the track of those that have preceded them. I have watched them for hours together, and have seen raft after raft of these little creatures go over in safety, when, if they had attempted to get across singly, they would all have been swept into the river.—*Wilson's Western Africa*.

CURIOUS, IF TRUE.—A curious, and we must add very apocryphal, circumstance, is said to have occurred in the silk factory of M. Garibaldi, at Cremona, which has caused some discussion among the Italian journals. It is positively stated that, in that factory, a quantity of silk-worms, instead of forming the cocoon as usual, actually wove a kind of silk ribbon, of the breadth of an inch, and the length of upwards of twelve feet. In the course of the denials and assertions exchanged on this matter, it has been elicited that a similar phenomenon, only on a much larger scale, took place at Alessandria in 1836, in the silk factory of Dr. Grillo, where the silk-worms wove a ribbon two inches broad and upwards of sixty

feet in length, part of which is now preserved in the Museum of Natural History at Turin.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 3.]

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[PRICE 2d.

BRITISH INSECTS.

MOST of our British entomologists collect only British insects; and this is frequently made a matter of reproach against them. At home they are accused of a want of philosophy, and on the Continent it is believed that a kind of patriotic feeling induces them to restrict their collections to the insects of their own country. There is possibly some truth in both of these allegations, but in the majority of instances neither of them is true, the reason for the practice of English collectors being that they have neither time nor means to do otherwise. They have little time for collecting; frequently they are obliged to confine their attention to one Order, or even part of one, or else they have no means of providing accommodation for more than a very limited number of specimens. This is true of the bulk; the few exceptions must answer for themselves as to their pseudo-patriotism, want of philosophy, or whatever else may induce them not to extend their

studies beyond the limits of this sea-girt isle. There exists against this exceptional class a cause of complaint of much greater importance to the mass of our collectors, namely, their practice of paying extravagant prices for British insects, simply because they are British, for not only is far more than the intrinsic value given, but a temptation is held out to pass off foreign specimens as British, and even to introduce, as natives, species which have no claim to be so reckoned, and thus the very principle of collecting only British insects is rendered nugatory. We say nothing about the spirit which prompts to the possession of rarities at any cost, so that the end be obtained of saying of any one of them, "it is in *my* collection." Such a spirit has nothing to do with Science, nor is its possessor worthy to be reckoned among scientific men. As a principle there is no valid objection against buying English insects; indeed, without buying, there are many species that there is scarcely a chance of obtaining, but it would be better both for

collectors and collections if the *amor habendi* were kept within due bounds. Collectors for sale would gain more by turning the whole of their captures into money at moderate prices than they now do by selling a few at a fabulous figure, and collections would be enriched by the insects that, under the present system, perish in the collector's boxes.

But, after all, looking beyond the mere possession of species to a knowledge of them, there is nothing like hunting for and taking them oneself: far more will be learned in one day, by having the insects alive, than in a week's study of their dry bodies; indeed, we once heard one of the most learned Coleopterists say, "that he never knew a beetle until he had seen it walk across the table." And further, let the British collector console himself with the reflection, that although the most of the insects found in Britain are also common to Europe, the field of observation of their habits is everywhere very little worked. Here then, it seems to us, that English entomologists, hampered as most of them are with hindrances, have scope for employment quite within their means. Not only would the occupation be greatly pleasing, but the result would be of immense advantage to Science.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in postage stamps to the publisher.

CARABUS.—Your attention is requested to the first two lines of the notice "To Correspondents." *Onthophagus Taurus, Vacca, medius, fracticornis, cænobita, Dillwynii, nuchicornis, nutans, ovatus*, and three species of *Bolbocerus*, are given by Stephens as British. *Odontæus* not. The *Pterostichus* is *erythropus*, Marsh. Dawson.

R. P., PARLIAMENT STREET.—The genera of the English water-beetles are figured in Shuckard and Spry's 'British Coleoptera delineated.' We know of no other work in this country; but if you require the names of *species* it would assist you but little. We shall be glad to hear from you again.

DUPLICATES AND DESIDERATA.

Mr. Proctor's Duplicates.—For goodness sake insert in your next

Number a notice to subscribers respecting my list of duplicates published last week, and prevent any further application for them. I have up to this time received exactly a dozen boxes of insects per post and railway, besides the trifling number of sixteen letters, all requiring specimens as early as possible. I have supplied those whose applications I received first, but my stock will soon be exhausted. Entomologists who do not receive an answer to their communications within ten days from this date, will please understand that I am unable to meet their demand.—WILLIAM PROCTOR, JUNR., *Durham*; *October 28, 1856.*

Duplicate Lepidoptera.—I have duplicates of the following:—

Cidaria didymaria,
Anticlea rubidaria,
Harpalyce picaria,
 „ *ocellaria*,
 „ *galaria*,
Phæsyle psittacaria,
Melanippe rivaria, very fine,
 „ *amnicularia*,
Emmelesia rivularia,
Zerene adustaria,
Ephyra punctaria,
 „ *poraria*,
Ania emarginaria,

and a great number of other species; but not having many of them it is useless to draw a lot of applications for them. Those parties who have applied for any species mentioned above, and have not yet received them, may depend upon having them in due time: the only reason for the delay is that my boxes are not returned as soon as I could wish. Please not to forward any boxes when you apply for duplicates. I

should feel obliged if any one would write to me (enclosing a marked list of his requirements) that could forward me all, or any, of the following:—*Epione parallelaria*, *advenaria* and *H. sagittaria*.—E. S. NORCOMBE, 5, *Salutary Mount, Heavitree, Exeter*; *October 28, 1856.*

CAPTURES.

Deilephila Galii.—On the 21st August *Deilephila Galii* was taken on the Sand-hills at Hedderwick Hill, near Dunbar, by S. Walker, Esq.—ALFRED O. WALKER, *Ches-ter*; *October 21, 1856.*

Phlogophora empyrea.—I understand that since the date of my last communication other specimens of *Empyrea* have been taken, but at present I am unable to give you particulars. — H. COOKE, *Brighton*; *October 26, 1856.*

Phlogophora empyrea.—It appears from the 'Substitute' as if only three collectors have taken *P. empyrea* this season. Permit me to send you a list of captures, taken to my knowledge, by myself and others in this locality, which can be verified by Mr. Foxcroft, who accompanied me on the 14th October inst., on which day I captured three *P. empyrea* and one *Agrotis Saucia*, and Mr. Foxcroft at the same time captured two *P. empyrea*. On the 17th inst. Mr. Howse and Mr. Hemmings captured one *P. empyrea* each. On the 18th inst. I was again successful in capturing one *P. empyrea* and two *Agrotis Saucia*, and Mr. Tidy on the same day took one *P. empyrea*, and Mr. Foxcroft on the 21st took one male *P. empy-*

rea. I should feel truly obliged by your inserting this statement in your next 'Substitute.' — GEORGE SMITH, 9, King Street, North Street, Brighton; October 27, 1856.

Capture of Leucania Vitellina in England.—August last was quite an interesting month to me. Ever since the middle of February had I been diligently searching, day and night, for Lepidoptera, but not one single species could I get hold of that was new to my collection: true I caught some few good insects, but nothing for my own cabinet. This state of affairs continued until towards the end of August, and certainly was sufficiently discouraging, when all at once things took such a change that within the short space of a week I took *Musculosa*, *Exigua*, and a species new to our list! Fancy having three such prizes on one's setting-board at one and the same time. It certainly was very jolly, and abundantly compensated for "no end" of the blanks and disappointments I had previously experienced. My "stranger" proves to be *Leucania Vitellina*, a species that appears in the south and centre of France in August and September, but is nowhere common. The locality in which I obtained this species was certainly rather a strange one; it was in my own little garden in the centre of this town. I saw the insect on the wing, and, without suspecting it was anything uncommon, made more than one attempt to catch it with my net, but failed: it went into a dense plant of *Epilobium*, and I could not drive it out. In accordance with my nightly custom I placed honey on such posts

and flower-sticks as were available, and in a few minutes I saw the moth reappear, and after hovering about for a short time it went straight to the nearest honey-bait and settled quietly. I then saw it was a stranger, and lost no time in boxing it: a little chloroform finished the business, and the insect is now in my cabinet, and numbered amongst my treasures. —H. COOKE, 8, Pelham Terrace, Brighton; October 26, 1856.

Captures at Marlow.—Last evening a specimen of *Dasycampa rubiginea* was taken here at sugar. It was evidently fresh out, but indulged in a flutter when in the pill-box, which has lessened its beauty. A fresh *Leucania crassicornis* was also taken the other day, with a few *Lota*, *Macilenta*, and *Libatrix*, and other common Noctuæ of the season. *Defoliaria* is just making its appearance, to be followed by *Cassinea*, *Plumigera*, and *Borearia*.—REV. BERNARD SMITH, Marlow; October 25, 1856.

COMMUNICATIONS.

[Continued from p. 23.]

A Beginner's List of Butterflies, &c., at Bisterne.

L. Rubi.—June 20. Bred. It is quite one of the entomological characteristics of this immediate neighbourhood, that the larvæ of this insect appear in marvellous numbers, completely strewing the ground: indeed a person walking across a heathy place here called the "Warren" must be cautious lest he tread upon them.

L. Quercus.—July 21. I dare say that this is more abundant

here than I suppose. I bred a female, but did not know her useful qualities. I found a larva exactly similar to the one that produced *Quercus* some time after, on July 27: it changed to an egg-shaped cocoon, exactly similar to the other, rather smaller (but the first was a female), and lo! and behold! it has not come out yet. The first changed June 10; this last one July 28! I hope it will come out next spring. Does this concern the *Las. Callunæ* question?

P. Populi. — December. At light.

Cl. Neustria. — July 18.

O. Potatoria. — August 1. Came freely to light.

S. Pavonia-minor. — Found a larva trundling along the path on the "Warren," August 15: I dare say it is common on the heaths. A poor man here had seen one casually, which he wanted to keep for me, and with that end, in entire simplicity laid it (as he said) on one side of the path. Of course he had the astonishment of finding it gone when he went again to look for it. He described it very well though, and compared the fascicles of bristles to the flowers of the heath.

Cilix Spinula. — May 16. Second brood, July 20.

Enigma. — An astonishing *Chærocampa* larva has been a source of much amazement to me. I found it under a damp log in a wet place on January 19! It drew in its head and shoulders quite naturally, was of a dark colour, and a lively imagination might have discovered traces of eyes on the sides. I took him home (he was about the size of a full-grown

Buff-tip), and put him into a pot: he descended into the earth. After some time I looked again, and *quantum mutatus ab illo!* he was shrivelled into skin!

Enigma. — A beautiful larva, bombycoid, feeding in a damp place on *Iris Pseudacorus*, August 23, spun a few days after. Brown, hairy; broad dorsal and lateral lines red, black and white in checker. Larger than *Acronycta Rumicis*, of which it reminded me.

May I be allowed here to express the grateful thanks of myself, and I am sure of many another beginner, to the author of the 'Manual of British Butterflies and Moths?' I have, I must own, taken every possible opportunity in the above memoranda to carp at the statements in the the 'Manual,' but I have done so quite in love, for as every one must see "it amuses me and does him no harm." No: the only fault I find with the 'Manual' is, that it makes me wish for the speedy lapse of time; no sooner have I devoured one Number than I long for another. All honour, then, to the author of the 'Manual!' Were it not for that charming monthly visitor, how many would know and care no more about moths and caterpillars than they do now about — beetles! I wish some beginner in the metropolis, or some large town, would set on foot some scheme by which we all could testify our gratitude for the 'Manual' and 'Intelligencer' in a tangible and lasting way. It might incite some one "learned in the Staphylinæ," to give us a "Manual of British Devil's Coach-horses?" But what could have induced me to suffer

such very superficial memoranda as the above to appear in print in the 'Substitute?' If they do appear, please to lay the blame on the editor for admitting them. For my part I am satisfied that they will cause much pleasure to many beginners, for there are very few, I should think, who have not collected more species, or who could not show a better result of their first year's study of the 'Manual.'—LIMACODES TESTUDO.

Explanations by Paterfamilias.

No. 1.

"I put the jam-pots containing the remaining pupæ," &c., (Intelligencer, p. 2.)—My boy wanted me to tell him why Mr. Douglas kept his pupæ in jam-pots, and whether he kept large pupæ as well as small pupæ in jam-pots. Now if I understand the matter rightly (and perhaps you will kindly set me right if I make a mistake) it is only the pupæ of the smaller Lepidoptera that are kept in jam-pots, and none of those that require earth are so kept. The novel breeding-cage (of which I once heard that the idea was started by Mr. C. St. Gregson) is principally used for the leaf-mining species, though applicable also to many external feeders, and to the leaf-rolling and seed-eating *Tortrices*. Talking of *Tortrices* reminds me to ask when are we to have a book on that family: for my own part I can't see why the *Tineæ* should be so much patronised to the neglect of their elder brethren. Now, don't say I'm rambling again; and really you were too hard upon me before, poking fun at me in print; few people like to be caricatured in

Punch, and, except that it has no wood-cuts, the 'Intelligencer' has turned out a species of Entomological Punch. The jam-pots are ground a little at the top and covered over with a flat piece of glass so as to exclude the air. They form a very clean and simple sort of breeding-cage.

No. 2.

"Unfortunately for agriculture the new enemy belongs to that order of insects called *Diptera*, and the number of entomologists who attend to and study that Order is not numerous," (Intelligencer, p. 17.)—Here my boy completely posed me, for having first asked, "What are *Diptera*?" which was not a difficult question to answer, he next enquired, "Why don't entomologists attend to the flies?" Really, I declare I didn't know what to say. I felt very much inclined to tell him not to ask such questions, but then, I have always been in the habit of encouraging him to ask when he wanted information, so I told him I would give him an answer the next day. Having thus obtained a reprieve, as it were, I proceeded to ponder what answer I should give. It will not do, thought I, to say they are not often met with; nor will it do to say they are all so much alike, for the most superficial can see the difference between a *Syrphus* and a *Culex*. I cannot say they are difficult to set. Then I thought there is no one to help a beginner, but no, there is Mr. Walker, and, though I have not the pleasure of his personal acquaintance, I have always understood he was most ready to give any assistance in his power to the

enquiring student: in short, the more I thought about it the more perplexed I became. So I was obliged to tell my boy, after twenty-four hours cogitation, that the reason "why entomologists didn't attend to the flies" was that their tastes didn't lie in that direction. Perhaps you will say that this is no explanation; but I just send you the difficulty as it occurred, and the way I got out of it.

No. 3.

"When a moth emerges from the pupa it is natural for it to remain quiet till its wings are fully developed," &c., (Intelligencer, p. 18).—My boy wanted to know how he should always be able to tell whether a moth was fresh out of the chrysalis, for he had a sad misfortune in May; he took a Puss Moth off a willow tree and killed it at once, and then discovered that the wings, though grown, were not stiff, and consequently the moth was of no use. Now, in the first place, by putting your finger under the wings and pushing them out, you will soon find out whether they are limp or not; and besides, all insects when they emerge from the pupa have the body much swollen, and discharge a drop, or drops, of some liquid (generally dark-coloured) from the anus. If, on taking a *Noctua* or *Bombyx* from a paling, it makes a mess in the box, it is not then ready to be killed, and it should be kept for several hours before you offer to kill it: so that the greenhorns should notice

1st. Whether the wings are limp.

2ndly. Whether the body is swollen.

3rdly. Whether any liquid is discharged.

And if any one of these is the case, be cautious and do not proceed too hastily to deprive the insect of its life.—PATERFAMILIAS.

[To be continued.]

Phlogophora empyrea.—I beg leave to "substitute" a correct account of the capture of *Phlogophora empyrea*, besides those named in 'Substitute,' No. 1. Five other collectors have taken this species, not one of whom has the slightest idea of foreign specimens of *Empyrea*, *Alniaria*, or *Erythrocephala*, being in this town. Messrs. Cooke and Winter seem better informed. If such is the case, I should be particularly glad to know who has them, certainly not to palm them off as British. These sort of charges ought to be well authenticated, not insinuated. I annex a list of *Empyrea* taken, and by whom. In justice to myself and others I should be very much obliged if you would insert, as early as convenient, something to the above effect.

Empyrea taken.

15th Oct. Mr. Foxcroft, 2.
 „ „ Mr. Smith, 3.
 16th „ Mr. Howse, 1.
 „ „ Mr. Foxcroft, 2.
 17th „ Mr. Hemmings, 1.
 18th „ Mr. Tidy, 1.
 20th „ Mr. Smith, 1.
 22nd „ Mr. Hemmings, 1
 much worn. And two others by Mr. Foxcroft, are all that I am cognizant of. None of them are now for disposal.—JOHN HEMMINGS, 2, Bedford Buildings, Brighton; October 30, 1856.

EXTRACTS.

NOTES ON NOCTUÆ: FROM
GUENEE'S NOCTUELITES.

[Continued from p. 11.]

Leucanidæ.

This is so natural a family, that all the early writers on the group have themselves separated it. Yet, at first sight, it would seem to be divisible into two distinct families, especially were we to lay the greatest stress on the primary states of the insects. But, still, in taking this step we should meet some intermediate genera which would not fall under either absolute division. I will give the history of the two series.

The larvæ of the first series, or *Leucanidæ* proper, are of pale colours, but yet distinct, generally flesh-coloured or yellowish, and streaked with a multitude of fine lines, amongst which the ordinary lines are the most distinct. They are entirely cylindric, and the head, which is slightly flattened, is rather retractile. They all live on grasses, and seek no other shelter than the centre of the tufts or the dry leaves which are most in their reach. They enter the earth in order to change to a chrysalis of the ordinary form, shining, and pointed at the tip. The perfect insects generally participate in the pale colour of their larvæ: their fore wings are sometimes without any markings, sometimes with the ordinary lines slightly indicated; the stigmata are invisible, or reduced to one or two little dots; the wings are kept folded in a rather sloping roof; and the perfect insect takes shelter in the

herbage during the day; in the evening they fly tolerably rapidly: the two sexes are precisely similar in form.

The larvæ of the second series, or *Nonagridæ*, have particular manners, which necessitate modifications in their organisation. They live closely enclosed in the stems of *Cyperacæ*, *Typhacæ*, or *Gramineæ*, which grow on the water's-edge. Owing to this style of life they have a peculiar aspect. They are more elongate; their skin is shining; their consistence soft, excepting the horny plates, which are very distinct. Almost deprived of the colouring influence of light, they are dull, and as it were transparent, rarely with lines, and slightly marked. Moreover, like all internal feeders, they have the spots half warty and lighter than the ground colour. Their pupæ are placed in the very stems where the caterpillars have lived. They have the abdominal portion very prolonged, but more obtuse than those of the preceding section. There is also some difference in the perfect insect: the stigmata have a tendency to reappear, though the lines remain mostly obliterated; the wings form a flatter roof, but the insects do not differ in their habits; the body has an extreme tendency to turn greasy, as is the case with all species the larvæ of which feed in the interior of vegetables. The two sexes are habitually very different; the female, besides being much larger than the male, is generally of a paler colour; the abdomen is disproportionately long and large. They lay an unusual quantity of eggs; hence the specimens are generally very abundant

in the localities (always rather restricted) where they occur.

The species of the family *Leucanidæ* are very numerous; and as their markings are often *nil*, the differences which separate them are often insignificant. Hence, they are very difficult to study. This study is, besides, rather unsatisfactory, because it relates to the least ornamental as well as to the least varied of all the Noctuæ. However, we do not see that authors have neglected this group more than others, and there are even entomologists who have a sort of predilection for it, which is explained by the pleasure we derive from overcoming difficulties. (Vol. I., pp. 65, 66.)

Leucania.

The larvæ of *Leucania* are very closely allied to each other, and one needs all the experience that one can acquire from long practice in breeding larvæ in order to distinguish them; even the most skilful is often deceived. Not a single European species, to my knowledge, is green: all are of a dull whitish, or of a reddish or yellowish gray, with the ordinary lines continuous and well marked, and between these lines a number of other lines, or supernumerary lines, often resulting from the agglomeration of brown or reddish atoms. These are nearly all the markings, though sometimes the subdorsal line is marked with black spots: the spiracles are often entirely black or brown. These larvæ feed exclusively on grasses, and we find them on those which grow with their roots almost in the water, and on those growing on the most arid hills. Those

grasses which form thick tufts afford a natural shelter, in the midst of which the larvæ pass their lives, only climbing to the extremity of the leaves in the evening or at night. Those which do not feed on grass growing in tufts have to seek a shelter among dried leaves. Some of those which feed upon aquatic grasses take shelter in those stems of which the top has been cut off or accidentally broken. They penetrate till their progress is stopped by a knot, and their excrements, which fill a portion of these tubes, testify that they only quit these hiding-places when obliged to seek food. This retreat, if it does not protect them from prying Ichneumons, completely shelters them from the attacks of birds; but that is not its only benefit: they make use of it when the period arrives for their metamorphosis. In fact, they do not enter the earth like their congeners, and they content themselves with spinning above and below them a silken diaphragm mingled with gnawings of reed. (Vol. I., p. 70.)

Nonagria.

This is a genus much more remarkable for the habits of the larvæ than for those of the perfect insects, although these latter are well deserving of attentive study. These larvæ spend their whole life, from the time they quit the egg till the perfect insect appears, in the interior of stems of aquatic plants, eating the pith and never touching the leaves. The small larvæ, when quitting the egg, generally live in companies on one stem, and at the top where the part to be perforated is

soft in proportion to the weakness of their mandibles; but before long they separate, and each of them proceeds to take possession of a separate stem or portion of a stem. They enter by piercing a hole at the lowermost portion, which they immediately cork up with gnawings; then they rise by degrees in the tube as they consume the pith, and the excrement tends to fill the empty portion. Should the plant be one of the *Gramineæ*, and consequently should the progress of the larva be stopped by a knot, it tries at first to pierce it, and, when it finds that this is impracticable, it constructs a circular opening hardly of the same diameter as its body, by which it goes out without being at the trouble to close the opening: it then recommences its operations, either above the knot or in a neighbouring stem, and thus continues till it has attained its size. When on the point of changing to a pupa, which happens in the stem itself, it again forms an opening, but this time it only removes the inner substance of the stem, and leaves intact the external pellicle. The hole is no longer of the same size, and instead of being rounded is decidedly oval and much larger. One can see the object of this difference, because the perfect insect in quitting the stem would require a larger space, and having no mandibles ought only to find an obstacle proportioned to the efforts which it can make with its head. As to the foresight which governs these dispositions, it originates in that astonishing faculty which we qualify rather contemptuously as instinct, and on which reflection calls forth inexhaustible admira-

tion.' After having made all these arrangements, the caterpillar has only to consider how to place itself most conveniently to undergo its transformation. It spins a diaphragm of silk and gnawings beneath it, and a second, similar to it, above it. Sometimes it even forms a complete cocoon formed of silk and gnawings, wherein it changes to a pupa. This is always placed vertically, but the head is sometimes placed uppermost, sometimes downwards; in the latter case the hole for the exit of the perfect insect is at the bottom. M. Rambur has noticed instances of pupæ driven out of the stem by the action of vegetation, when they had undergone their change at the summit. When the *Nonagriæ* arrive at the perfect state they lose all the peculiar interest which attaches to their early stages: they then fly, as all other *Noctuæ*, at dusk, among reeds in moist places. The females, furnished with an abdomen especially long and large, remain nearly motionless all their lives. The males, much smaller and generally more lively coloured, have a tuft of diverging hairs at the extremity of the abdomen. (Vol. I., pp. 99, 100.)

THE STUDY OF ENTOMOLOGY.

If the dignity of a study were in proportion to the magnitude of the object studied, Entomology would be properly regarded as a trifling pursuit. The conceit of youth may be excused when the little vaunts itself over the less, but we are at a loss to conceive why a man devoted to one pursuit should sneer at the application of equal powers of mind to subjects

in which he has no interest, because the objects of it are of small magnitude. A man who can find no better reason to justify his contempt for the study of insects, must have so much more conceit than decent sense, that the dignity of argument would be offended, and its purpose perverted by an attempt to convince him that he judges foolishly.

A prejudice, however, does exist in the minds of some intelligent men against the study of insects, because they identify the the entomologist with the collector, an error we need not take the trouble to expose. But there are other objectors who, if they were honest to themselves, would find that their assumed contempt is in fact a dissatisfaction arising from ignorance, and a consciousness that there is much to be observed which they never saw, and discoveries to be made for which they have neither the aptitude nor the preliminary information. To other persons insects are unpleasant or repulsive objects unless they present themselves in delicate forms and court-dresses. By such fastidious people the little creatures always and everywhere about them, are supposed to have no mission in the world but to annoy and irritate them, or to exercise some insatiable malign power over man and vertebrated animals destructive to their comfort and injurious to their health. But if this were true, it should be a motive to the study of their production and habits. Personal interest and benevolence should unite to encourage an examination of the physical structure and modes of life of such insidious

enemies. But that which is most common and the most formidable objection to the study of Entomology is the necessity of an acquaintance with a systematic classification embracing 400,000 living forms. This objection, or rather impediment, to the study, is more fancied than real; but it is no part of our purpose to explain or defend the modern system of classification, or to show how, by a few divisional lines, each individual of this vast multitude of varied forms may be assigned to its own family and tribe. This, however, is the use of classification, while it encourages and strengthens the faculty of observation, and directs the mind of the student to those resemblances which are characteristic of family alliance,—those differences which distinguish races.

[To be continued.]

NEW BOOKS.

LIST OF BRITISH CURCULIONIDÆ, WITH SYNONYMA. By JOHN WALTON, F.L.S., &c. London, 1856. Printed by order of the Trustees of the British Museum.

There is not a Coleopterist in the kingdom but will be pleased to hear that the long-expected List of Rhyncophora has at length appeared: there is not one Coleopterist but will be disappointed with it. The ability of Mr. Walton for the task of revising the nomenclature of this difficult section, fortified as he has been by correspondence with the great German entomologists who have made it their peculiar study, is on all hands admitted, but he has failed

to convey his knowledge to others. The names placed under each recognised species as synonymes, are quoted (with some exceptions) without the prefix of the genus, and the names only of the authors are affixed, without a reference to the place in their works where they are to be found. An Englishman might guess what is meant, but so he might without this list, and for a foreigner the task is hopeless, a result the more to be regretted as the author has attained a European reputation. But there is a still graver fault: the genera are not always applied correctly. Take the following for one instance out of many:

ANTHRIBUS, *Fabricius*,

A. ALBINUS, *Lin. Marsh, Gyll., &c.*

Now, as the genus *Anthribus* was not published by Fabricius in the 'Systema Eleutheratorum' until 1801, when Linnæus had been dead twenty-three years, this species cannot be called the *Anthribus albinus* of Linnæus. It was included by Linnæus in his genus *Curculio*, a name which has no representative in this list, and is only recalled to our recollection by being used as a foundation for a family appellation.

From our knowledge of the patience and assiduity with which for many years the author laboured at this, his favourite family, we entertain no doubt that this list is correct; it was only required that he should have put upon paper what he had in his head, or rather what he had at his fingers' ends. The requisite corrections can easily be made in the next edition, which we hope will soon appear, for this is often unintelligible.

INSECT CABINETS. — On Tuesday next, 11th inst., Mr. J. C. Stevens will Sell at his Great Room, 38, King Street, Covent Garden, the collection of Insects of Charles Lamb, Esq., and FOUR CABINETS.

Enquiries having often been made for Cabinets, we beg to direct attention to this Sale.

Second Thousand. Price 2s. 6d.

THE ENTOMOLOGISTS' ANNUAL FOR 1856.

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Objects of a Collection of Insects.

Ghent to Glogau, and Stettin to Schaffhausen, in search of Entomologists.

Important New Works on Entomology.

List of Entomological Books now on Sale in London.

John Van Voorst, 1, Paternoster Row.

* A Supplemental List of British Entomologists will be given in the 'Annual for 1857.'

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, November 8, 1856.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 4.] SATURDAY, NOVEMBER 15, 1856. [PRICE 2d.

FOREIGN INSECTS.

As a rule foreign insects *must* be bought; and this fact alone is sufficient to limit the number of their possessors; but when the time, space and expense, requisite for their preservation, are also considered, it is evident that the persons in this money-getting country, who will attend to exotic Entomology, must always be few. But the advantage to Science from the possession of a collection of foreign insects is so great, that we cannot but be desirous that those who have the power should make one—not of all Orders, for that would be a hopeless task—but each person of some one Order, or even a Family. There are hundreds of wealthy men that if they only had a taste for Natural History might find in exotic Entomology an employment for their leisure of much service to themselves and Science. It seems that only individuals and nations can succeed in forming and keeping large collections of insects, for societies to which such a collection

was deemed to be a necessary object have failed in their endeavours to keep it together. The Entomological Society of France, and the Zoological and Entomological Societies in England, are examples of the truth of the adage, “that what is everybody’s business is nobody’s business.” The advantage of a collection of foreign insects is not merely the knowledge that so many of them in such variety of form, structure and colour, exist, but that we have in them, so far as such things can avail, the materials for studying the system that Nature has adopted in the creation of organised beings. We say as far as such things can avail; for he who has before him only the dead dry forms of insects, of whose manners and habits he knows nothing, is in the position of one who views a show of figures without knowing what springs govern their movements, or indeed any more than the names of the actors. Still such knowledge, cut and dry as it is, is not to be despised; from time to time it may be vivified by the discoveries of observers of the

insects in their native countries: indeed a good deal, considering the difficulties attendant, has already been accomplished; and we hope when the collectors, whose enthusiastic ardour has for years sustained them in the cause of Science in the midst of fever, death and desolation, shall give the result of their experience to the world, that Science, as well as the individuals, may be enriched in proportion to the danger incurred in the acquisition. May it not be taken amiss if we remind those who would not see such services left to be their own reward, that they could not better show their appreciation of them than by contributing their share of the expense *now*, or it may happen that for want of support the supply of novelties and rarities may be stopped, and the means of getting them not again occur. It should be a rebuke to our English collectors to know that rare insects from the ends of the earth are sold at less prices than British ones. So much for individuals. Public museums should be in a position to do more in procuring novelties; but, with scarcely an exception, museums are not up to the mark in this any more than in other respects, though whether the fault be that of their conductors or supporters it is not now our purpose to discuss.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in postage stamps to the publisher.

A LOVER OF NATURE.—Rymer Jones's 'Outline of the Animal Kingdom,' and Westwood's 'Classification of Insects.'

J. B., WISBECH.—No. 1 of 'The Substitute' was on sale at 6 P.M. on the Thursday prior to its date. No. 2 was on sale on Thursday afternoon, and the sale to the trade was completed at 9.30 on Friday. The paper will always be ready on the Friday, and may be procured of Kent & Co., Paternoster Row, as well as of the publisher.

DUPLICATES AND DESIDERATA.

Duplicate Lepidoptera.—I have a few specimens for exchange of the following species:—

Liparis Salicis,
Agrotis Putris,
Trachea Piniperda,
Miselia Aprilina,
Epunda Lichenea,

Aporophila Australis,
 Philopyra Pyramidea,
 Odontopera Bidentaria,
 Himera Pennaria.

I am in want of

Steropes Paniscus,
 Pamphila Comma,

„ Actæon,

Apatura Iris,

Erebia Cassiope,

Trochilium Cnyipiformis,

„ Myopæformis,

„ Formicæformis,

„ Culiciformis,

Procris Globulariæ,

Enlepia Cribrum,

Lithosia Quadra,

„ Griseola,

„ Stramineola,

„ helveola,

Orgyia Coryli,

„ Fascelina, (female)

Cerura Furcula,

„ Bifida,

Notodonta Dictæoides,

Clostera Curtula,

Trichiura Cratægi,

Catocala Promissa.

—E. LETHBRIDGE, 40, *Old Town Street, Plymouth*; November 1, 1856.

Lepidoptera.—I am a mere beginner in Entomology, but I have the following to spare, and any person can have them on application.

Papilio Machaon,
 Melitæa Artemis,
 Erebia Blandina,
 Satyrus Semele,
 Thanaos Tages,
 Smerinthus Populi,
 Anthrocera Filipendulæ,
 Procris Statices,
 Euthemonia plantaginis,
 Lasiocampa Quercus,
 Chersotis plecta,
 Agrotis aquilina,

Polia Chi,
 Taniocampa Gothica,
 Plusia Gamma,

„ Chrysis,

and several other things. I would be obliged to any one that could help me with

Liparis auriflua,

„ chrysorrhæa,

Orgyia Pudibunda,

Orgyia Gonostigma.

—W. CAIRNES, *Head of Church Street, Durham*; November 2, 1856.

Lasiocampa Rubi.—Will any of your correspondents favour me with a few eggs or larvæ of the Fox Moth, as I wish very much to rear it from its earliest stage.—EDWARD R. PRIEST, 14, *Parliament Street, Westminster*; October 30, 1856.

Allow me to suggest that when applying for any of the duplicates mentioned in 'The Substitute,' a great deal of writing may be saved by enclosing a marked list of desiderata in the same envelope with the application for any insect mentioned, as the writer may have other duplicates that would be also acceptable; and it would be well if the list sent had a mark affixed showing what duplicates he had to forward if any of them should be wanted. In all cases I think it better to write first, never sending a box on the first application, for I have returned some on several occasions containing only a pair of *Rivaria*, which cost sixpence postage, whereas if I had known at the time all their wants I could have sent them many other species; therefore I think in all cases it is the best way to send a marked list at the time of application. Also another

important thing to facilitate exchanging is to return any box received by next post if possible. Now many of my correspondents suffer at the present moment from this cause alone. If persons retain your boxes from three to six weeks, how by all "that's slow" can we get along. Therefore remember to "Return Boxes per Return."—E. S. NORCOMBE, 5, *Salutary Mount, Heavitree, Exeter*; October 28, 1856.

CAPTURES.

Phlogophora Empyrea.—I am pleased to communicate the information to the readers of 'The Substitute' that on the 14th inst. I succeeded in taking in this neighbourhood two pairs of this rare insect.—G. SMITH, 9, *King Street, North Street, Brighton, Sussex*; October 20, 1856.

COMMUNICATIONS.

Fertile Eggs from single Female Insects.—I have been engaged for some time past in investigating the history of *Daphnia Schæfferi*, an animal the female of which produces fertile eggs even when kept separate from the male, and I write to you to solicit from the numerous entomologists, who will I know see this letter if you kindly insert it in 'The Substitute,' the details of any similar facts which may have occurred to them in the course of their observations: not only in the *Aphides* and *Cynipidæ*, but also in the moths, I believe such instances not very unfrequently occur. Jourdan has published several, and I shall feel greatly obliged to any entomologist who will forward to me any

similar observations. Permission to publish would enhance the obligation.—JOHN LUBBOCK, *High Elms, Farnborough, Kent*; November 8, 1856.

[We shall be happy to publish any communications on this very interesting and obscure subject.]

The Lancashire Collectors.—Did you ever read such nonsense as Mr. Gregson's in the 'Zooologist?' I have no time for controversy, but surely he invited "a setting down" by some old collector, and it is hardly fair of the editor not to allow him to have it. Can you translate his Latin,—what is "*nigri foldella*?" Stark, staring nonsense! Compare our dog-latin with the beautiful classic of Zetterstedt and see how refreshing it is to the scholar after the trash we print in England; or look to the beautiful introduction to Marsham, by the Bishop of Carlisle, and think of the Latin of this time. *PROH PUDOR!*

Hybernating Larvæ and Pupæ.—Can any one tell me where the cocoons of those Bombyces which pass the winter in the pupa state are to be found. *Eriogaster Lanestris* must always pass the winter as a pupa. The larvæ of *Lasiocampa Quercus*, *Trifolii* and *Rubi*, are said to hibernate, yet all the larvæ of *L. Quercus* that I have ever had spun up in the autumn, passing the winter as pupæ; probably *Trifolii* and *Rubi* sometimes do the same, and very likely *Gastropacha Ilcifolia*, yet I never heard of the pupæ being found. *Saturnia Pavonia-minor* we know attaches its cocoon to heath or other plants. Do others do the same? But even supposing that the larvæ hibernate they must surely be pretty well

grown, or at any rate easy to find. Does any one know where they would be likely to hide? as it would be quite as amusing winter's occupation to search for hibernating larvæ as to dig for pupæ.—CHARLES G. BARRETT, 37, Park Street, Mile End; October 31, 1856.

Steropes Paniscus.—In No. 19 of the 'Intelligencer' a correspondent, at Cirencester, notices the capture of *Steropes Paniscus*, and the editor adds, "this is a new locality for the local *Paniscus*." In the subsequent Number the correspondent admits he was in error, the specimens proving to be the common *Pamphila Sylvanus*. I beg to say that during the summer I took two specimens of *Paniscus* the same day, and saw others on the wing.—G. GASCOYNE, Newark; November 1, 1856.

Late appearance of Plutella porrectella.—It may not be amiss to tell you that I took, about a fortnight ago, a dozen specimens of *Plutella porrectella* evidently quite fresh and just out. As this is very much later than the time mentioned in the 'Calendar' for the appearance of this insect, it appears to me as if these must have been a third brood.—T. WILDMAN, Grove Place, Camberwell; November 1, 1856.

Notes on Lepidoptera.—I was much interested with the remarks in a "Beginner's List of Butterflies," and think we should soon know more about them if everybody adopted the same plan. There can be no question about the hibernation of *Gonepteryx Rhamni*, for I have taken them in the spring with the wings stained,

evidently from hibernating in a damp place. I think there are two broods in the year, one in the summer, and the other in the autumn, which hibernates. Last autumn (1855) the larvæ of *Pieris Brassicæ* abounded in Shropshire to such an extent that the brocoli were almost destroyed, and the savoy and borecole completely reduced to skeletons, and even the turnips were extensively attacked; it seemed as if the air would be filled with white butterflies this spring, but to my surprise they were nearly all Ichneumonised; certainly not one-fifth, perhaps not one-tenth escaped, the walls, railings and even trees, were studded with the little yellow or white bunches of Ichneumon chrysalides. I am pretty sure that there are three broods of *L. Aegeria* in the year; I have noticed them looking fresh in April, June and August or September; and as they quickly lose their beauty and fade, it is easy to tell a young specimen from one a few weeks old. The female of the second brood of *L. Megæra* appears to be larger and lighter than that of the first or any of the males. I never met with a *V. Atalanta* that had any appearance of having hibernated, and I think it very seldom happens. In Salop I could not find a specimen of this insect in 1854, and in 1855 it did not appear till nearly the end of September, and lasted till the beginning of November. What becomes of *V. Polychloros* in the autumn? They were pretty common the first fortnight in August, but since I have not been able to find one; yet they appear again in the spring. Is it possible that they retire into

winter quarters while the weather is still hot as it is in August? Surely there is more than one brood of *V. Urticæ*. The females which have hibernated must all have laid their eggs by the end of May, and yet the larvæ are not to be found in August, nor even September: they feed up rapidly, and do not remain long in the chrysalis: last year the latest brood, which was in October, had the spots along the costa of the upper wings, which are usually yellow, of a silvery white, so that they looked very conspicuous. I think I never saw *Thymeles Alveolus* close its wings over its back; the lower wings were always horizontal, the upper ones a little raised, so as not to touch the lower. I never met with a second brood. Although *P. Sylvanus* abounds in Salop I never met with one earlier than July: I do not believe in a May brood. In some rough fields on the top of Wenlock Edge, a range of hills in Salop, I found in June *Anthrocera Filipendulæ* in immense numbers, but searched in vain for *Lonicæræ*. There were plenty of pupæ in cocoons on the grass-stems, and I took about a score home: to my surprise in a few days they produced *Lonicæræ*; and when I went to the place, a fortnight after my former visit, *Lonicæræ* was in equal profusion, and scarcely a *Filipendulæ* to be seen: they were so abundant that there were generally at least half a dozen on a tuft of wild thyme, which grows there in abundance. The pupa of *S. Salicis* is black, with small flesh-coloured spots on the segments, and a good deal of yellow hair. I have frequently seen

Gnophria Rubricollis flying in the sunshine. — CHARLES G. BARRETT, 37, Park Street, Mile End; November 3, 1856.

Notes by an Old Collector.—Barren Wood, rich ground for an entomologist, is about eleven miles south of Carlisle, on the left bank of the river Eden. There the entomologist may luxuriate for infinity. It is likewise worthy the notice of the tourist in search of the picturesque. The forest is redolent of beauty. There are scenes viewed from the river of surpassing loveliness, and the picture, as seen from the Cat Clint (a rocky eminence rising abruptly from the river), is magnificent. As you stand on this lofty pedestal, the noble river below you gurgles over its rocky bed its drowsy music, breaking the stillness otherwise reigning around; and Coombe Wood, in wild grandeur of rock and tree, rises on the right bank of the river rugged and frowning. On your side, margining the rock on which you stand, and extending its front opposite the wood, is a meadow, for loveliness worthy the pencil of a Constable, a solitary oak heightening the effect. Bordering the meadow and expanding over a great surface, is an amphitheatre embracing nearly every variety of plant incidental to the North, the majestic oak towering over all the traceried fern and dark and bright hued shrubs gracing the rocky sides and lower region, and forming a scene that becomes graven on the memory for ever. Along the sloping sides in sportive playfulness flies *Nemeobius Lucina* in no niggardly numbers. Here are also the active *Thymeles*, the more

sluggish but pretty *Selene* and *Euphrosyne*, the strong-winged *Aglais* and *Thecla Rubi* and *Quercus*, the latter sometimes difficult to capture on account of its flying high amongst the oaks. In the same category, among the birch, may be placed *Brepha Notha*: that beautiful moth *Hipparchus Papilionarius* is to be obtained from the alder: from the alder, too, the caterpillar of that scarce moth *Geometra Sublunaria* is to be sought: I reared three from larvæ obtained from the alder growing on Rockliff Moss. At Tarn Wadling, near to Barren Wood, I captured *Russula* flying in the middle of the day. *Jacobææ*, which although also a day flyer, is classed among the *Noctuidæ*, as are also the *Lithosiæ*; yet I have seen a *Lithosia* (either *Complana* or *Complanula*) fly on an afternoon about the tops of oak in Wetheral Wood, as strong on the wing as a *Thecla Quercus*. In one of my excursions to Barren Wood having obtained more caterpillars than my larva boxes would hold, I had recourse to my moth boxes, and put two caterpillars, of what I considered *Cerapacha ridens*, into it. On taking the lid off to give them air they endeavoured to escape, and when one had his head on the edge of the box the other clambered over him and bit him on the back of his head; a greenish liquid oozed from the puncture, and the wounded larva dropped to the bottom of the box: watching his death I forgot his aggressive brother, and he escaped. At other times when I have had many caterpillars in one box, on opening it I have found the mutilated

remains of some, proving that certain caterpillars are carnivorous. Hybernating larvæ I have experienced difficulty in rearing; and after many ineffectual attempts to rear the *Lasiocampa Rubi* in my heather and oak feeding-cages I have tried another system. Having captured a dozen caterpillars on Houghton Moss, I brought some peat dust from the same place, and half filling a small wooden box with it I put the larvæ in (having first perforated the lid for air-holes), and placed the box in a cupboard abutting on the kitchen flue, and between Christmas and the end of January nine moths came out, six perfect insects and three cripples: the larvæ were full-sized when I took them about the beginning of October. With the larva of *Cossus Ligniperda* I have been eminently successful. I had a tin box made (the lid also well perforated with holes) and half filled it with sawdust; three full-fed *Cossus* larvæ were put in, and the box was placed on a shelf in the kitchen where a fire is kept, and in due course of time three fine moths emerged from the sawdust in perfect condition. I have never had a failure with a full-fed *Cossus*. Those that are found crossing a road are generally full fed. With regard to the colour of the larvæ of *Apatela Leporina*, all that I have seen in their early stages were white; those of a yellow colour were in their last stage and ready to change; and so convinced did I become of this, that when I captured a yellow-haired *Leporina* I placed it in my pupa box without food, and seldom failed in rearing it. Sometimes

I have captured larvæ nearly denuded of hair; what little was left was a greenish yellow, but those in that condition were generally too exhausted for further effort.—
 RICHARD CARTMEL, 13, *Williams Grove, High Park, Walworth*; November 3, 1856.

An Entomological Ramble in the Isle of Wight.—The morning of the 31st of July was as beautiful a day as an entomologist would wish to behold. We looked in vain to perceive the slightest trace of a cloud in the whole expanse of sky, and the sea had that intense azure appearance, which is so rarely seen on our English shores, but which forcibly reminds one of the seas of Italy and the south. We issue from our cottage, at Shanklin, at a little past 8 a.m., armed *cap-à-pied* with net, collecting-box, &c. Even the heat is very great, and would be almost insupportable were it not for a slight breeze from the west, which comes at intervals in gentle puffs of air almost imperceptible. We proceed on our way, after leaving the main road, up a deep (and steep) sandy lane, bordered on each side by a bank and tall hedge. We feel quite delighted to be at freedom among Nature's works; but at the same time our happy frame of mind is somewhat lessened by the hosts of Diptera who (finding a new subject to bother and suck at) play around and settle on our person. We especially notice a lengthy fellow of a fly in dusty brown apparel, with a shining eye, and a formidable-looking sucker, who appears to have a liking for the cloth of our coat, as he walks about thereon digging in the aforesaid proboscis.

We think this rather a novel propensity, and therefore do not molest him. But alas! we soon find that this apparent partiality for cloth is but a cloak for more carnivorous tastes, for we suddenly feel a sharp tingling pain on our neck, and on putting our hand to the place the very same fly darts away and settles on our coat again. Our interest in him is now changed to hatred, and we make a tremendous blow at him, but he seems to be used to that sort of thing and slips away, and we ourselves receive the blow without the satisfaction of destroying the wretch. However, we think we have driven him off at any rate, and walk on. Presently our glance happens to fall on the sleeve of our coat,—there sits the fly quite unconcerned, and slowly advancing towards our hand. We stand still to watch him. He walks on rather quicker, reaches the boundary of our sleeve, places one leg on our hand and scrapes about with it to make sure that it is flesh he's coming to, and then walks entirely on our hand: he reaches the centre and commences sucking. We behold him with malignant joy, and let him settle himself completely, in order to make sure of nabbing him. We feel the tingling again, and suddenly close our hand. We open it cautiously—he's not there! We give up in despair, and yield ourselves to our fate. We feel we have been wasting our time with the rascal, and set to work after more pleasing insects. The first thing that strikes us is the swarm of *Hipparchia Janira* and *Tithonus* that hover round every bramble-flower in crowds. We give a

sweep with our net and entrap quantities, of which, however, we only keep three or four, viz., two or three of *Tithonus*, and a male of *Janira* with the under wings nearly white. Suddenly a yellow insect dashes rapidly past us, and as suddenly stopping a few yards off, settles on a bramble leaf. The stout, robust make, and large head, proclaim it to be a "Skipper," *Pamphila Linea*. Now two or three more of the same species, and also *P. Sylvanus*, flit by, and are accordingly caught and pinned. We walk on, and presently cut a beating-stick from the hedge, and commence beating. Out flies a *Geometra*. We bag him, and he proves to be *Ypsipetes elutaria*, which we find after to be abundant in every hedge. While pinning the latter species a dark shadow passes over us rapidly. We turn quickly, and see *Lasiocampa Quercus* tearing off down the lane as if his life depended on his being at the end within a minute. We do not trouble ourselves to go after him, feeling sure that we shall see another shortly, but fix our *elutaria* and proceed. Here comes something! It can't be *L. Quercus*, being much too small and too dark. We fear he's too high for us to reach. Now he's here! A jump and a twist of the net!

We've got him! A Hairstreak. Can it be *Thecla Betulae*? Ah! now the wings open! A purple flash! Only *Quercus* (not *Lasiocampa*) after all. There must be a wood, however, at the top of the lane, which is certainly some consolation. This makes us proceed rather faster, keeping a good look out on either side for anything that may turn up. Out flies a moth, who is soon caught. We pin him into our box and examine him. *Zerene procellaria*? What a pretty creature! Now another! *Hemithea Cythisaria* this time. A few yards more and we reach the end of the lane, when, opening a gate, we find ourselves in a clover-field: what a delicious scent is exhaled from the myriad flowers as the soft breeze sweeps over them. We cannot refrain from lying down in the clover and enjoying a good roll in it (albeit to the great detriment thereof), our excuse being that we have only escaped from London the previous day; and the bare feeling of being free in the sunny fields puts us into ecstasies, and makes us perform vagaries that would cause an habitual liver in the country to stare with wonder.—ROLAND TRIMEN, 71, Guildford Street, Russell Square.

[To be continued.]

The Song of Bugflwatha.

[As we know enough of the persons mentioned in the following *jeu d'esprit* to believe they will not feel hurt or offended by its publication, and as we wish to please everybody, we will gratify the anonymous author by printing his contribution of the "wishiwashi."]

Should you ask me whence this story
With its music, with its magic,
With its wonderful perfection,
With its beauty with its wisdom,

With its deep and wholesome teaching,
 With its learning, with its science,
 With its wild conglomeration,
 I should answer, I should tell you,
 "Jolly Douglas told me of it;
 "He who writ the 'World of Insects,'
 "He who lives at pious Kingswood—
 "Kingswood by the Blackheath Station—
 "Station of the North Kent railway;
 "Douglas with the lots of children,
 "Douglas with the wondrous children—
 "Wondrous Alice, silk-haired Laura,
 "Laughing Polly, fattest Harry,
 "And a new and perfect baby:
 "Jolly Douglas told me of it."

 Kingswood, I have called it pious;
 If you ask me wherefore pious,
 I should answer, I should tell you,
 Pious because Spurgeon preached there;
 Spurgeon mountebank religious;
 And the ladies kissed the pathway,
 Kissed the pathway he had trodden,
 Made an idol of the preacher:
 Thus he made our Kingswood pious.

 Hear the song of Colymbetes,
 Water-bugfly—Bugfliwatha—
 Pretty Colymbetes fuscus.
 Hear the song of Colymbetes,
 Hear the song as Douglas told it;
 Douglas with the lots of children;
 He who writ the 'World of Insects.'

 One bright morn the silk-haired Laura
 Wandered happy in the sunshine,
 And she saw a water-bugfly
 Buzzing gaily in the sunshine,
 Buzzing in the happy sunshine,
 Just a speck in the horizon,
 Very far off in the distance,
 But she knew it was a bugfly,
 Water-bugfly, Colymbetes,
 Water-bugfly, Bugfliwatha.
 On its way it met a watchman
 With its stomach rainbow-tinted,
 It is called the great dor-beetle,
 But in science Geotrupes.
 Then the pretty Colymbetes,
 Water-bugfly Bugfliwatha,
 Fearful of the great dor-beetle

Plunged into a pool of water.
 And the silk-haired Laura caught it,
 And she took it to her father,
 Took it to the Jolly Douglas,
 And she writ a note about it.
 "Here's a note about a bugfly,
 "Put it in the Wishiwashi,
 "Put it in the Nambipambi:"
 Thus she now addressed her father.
 In 'The Substitute' he put it.

EXTRACTS.

 NOTES ON NOCTUÆ: FROM
 GUENEE'S NOCTUELITES.

[Continued from p. 34.]

Apamidæ.

The *Apamidæ* have characters in common with *Agrotis* and *Hadena*, and have been arranged by authors alternately near the one or the other. Their larvæ have a strong resemblance to those of the former group, and live like them if not actually buried, at least carefully concealed, and in such sheltered places that the light only penetrates in the slightest possible degree. Some are even stem-borers. The perfect insects bear traces of this secluded life; and a true entomologist would never confound them with the *Hadenidæ*, in spite of the resemblance of some of the *Apamidæ* with the *Hadenæ* of the section which includes *Thalassina* and *W-latinum*.

The *Apamidæ* are numerous in genera and species; and the species are generally very variable. As the creation of the family is quite a new one, it may afterwards be found susceptible of modification, and perhaps also of being divided. To indicate these divisions, I separate them into four

sub-families: the first corresponds to the family *Gortynidæ* of Duponchel: in it we find many larvæ completely stem-boring, but the greater part live simply concealed amongst roots; the second sub-family, which might be called *Xylophasidæ*, contains all the species which authors classed near *Xylina*, on account of the elongate form of their wings and their longitudinal markings, but they have no other connection with them. Their larvæ much resemble those of *Agrotis*, live nearly in the same way, and are sometimes completely vermiform. In the third subfamily, which may be called *Episemidæ*, I place those *Orthosiform* species which have been alternately placed with *Agrotis*, *Orthosia*, and *Hadena*. The antennæ of the male are very strongly ciliated, and the abdomen sometimes crested. The fourth subfamily contains the true *Apamidæ*. Their larvæ, less vermiform than those of the second section, are still of dull colours and with a shining skin, and, though not living in the earth or among roots, conceal themselves with care. The perfect insects have a family resemblance, and may be recognised, independently of the *ensemble* of their characters, by the terminal portion of their anterior wings,

which is always much darker than the ground colour. (Vol. I., pp. 119, 120).

Gortyna.

Of all the *Apamidæ*, this is the most curious in its manners, and which in that respect most resembles *Nonagria*. Like them, the larvæ are of pale colour, or with the spots and plates of the neck and anal segment horny and shining. They feed also on the pith of the plants, in the interior of which they pass their lives, and they contrive in the same way an egress for the perfect insect. The perfect insects, like the *Nonagriæ*, indicate their secluded life by the length of the abdomen and its tendency to turn greasy, but instead of being dull-coloured and with insignificant markings, they are on the contrary the prettiest insects in this family. The fore wings are generally of a warm tone, with the lines well marked. (Vol. I., p. 120).

Axylia.

The genus *Axylia*, represented in Europe by a single species, has hitherto been placed sometimes with *Xylina*, sometimes with *Agrotis*. From *Xylophasia*, to which it is most nearly allied, it differs especially by the abdomen not being crested. The larva of *putris* (the only species of which the transformations are known) also differs widely from the larvæ of *Xylophasia* in the form and disposition of the markings, since it has some resemblance with the larva of *Mamestra Persicariæ*. The perfect insects are all readily recognised by their oblong folded wings, which give the insect an

elongate form. There is a great resemblance in their markings; they are partly disposed lengthwise, as in *Xylophasia*; one especially notices two dark terminal streaks which run towards the reniform stigma, always the most distinct. The anterior portion of the collar forms a pale half-moon, spotted with brown, as in *Pygæra bucephala*. The hind wings are well developed, and the abdomen is conical, and so little covered with hairs, that it appears perfectly smooth and shining. Hence *Axylia* cannot be confounded with any other genus of this family. The species are all of small size: ours is the largest I know; the others all come from Africa. (Vol. I. p. 133).

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THE WORLD OF INSECTS; A GUIDE TO ITS WONDERS.

By J. W. DOUGLAS,

Secretary to the Entomological Society
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John Van Voorst, Paternoster Row.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 5.] SATURDAY, NOVEMBER 22, 1856. [PRICE 2d.

THEORY.

THERE are many grades of theory. In Natural History we have them from the notion that the tail of the caterpillar becomes the head of the butterfly, up to the 'Vestiges of Creation.' The proper term for such things is speculation; for we take it that a theory proper should be a deduction from facts, capable of explaining and being rigidly tested by all the circumstances pertaining to the subject to which it refers. To place a number of related facts together and call the assemblage a system is not enough; the spirit of genius must breathe upon the dry bones, give them cohesion, and erect them into a living body. It is only genius can do this, but genius itself fails if it be not master of sufficient data; it is then like one attempting to build a ship when he has only materials enough to make a raft. And if it be necessary for him who would propound a theory to have a great amount of knowledge as well as a large endowment of genius, only in a

less degree are these qualifications required in those who criticise the work; and when a theory is given to the world it behoves all to consider whether they are capable of understanding it, and pause ere they ridicule what they cannot comprehend. The greatest truths have come to light as theories; and, though clear and certain enough to the earnest minds of their discoverers, have had, almost invariably, to fight their way through ridicule and persecution until they were established as truths to the apprehension of men in general; the heresy of one age becoming the orthodoxy of the next. A theory which will stand the scrutiny of comparison with known facts has a great probability of being true, but the most severe test that can be applied is the discovery of a new fact: if it harmonise with the theory there is so much more reason to believe the latter to be true, but if it do not there is reason to believe that the theory is not sound.

To discover the System of Nature is the great aim of the philosopher: every student soon learns

that even in its minutest details the whole material creation is organised upon a plan, and it should be for the encouragement of the humblest to know that, although he may never rise to be a propounder of theories, his observations may afford to the systematic naturalist the very key-stone to the temple of the System of Nature. At the proper time the man to point out clearly the one idea of that system, or rather the idea of which that system is the exponent, will come, if indeed he be not already here, with the theory that, after the usual scuffle, will carry conviction to the minds of all enquirers.

In the 'Entomologische Zeitung' we read that the Entomological Society of Stettin have issued the *sixth* edition of the 'Catalogus Coleopterorum Europæ,' at the price of sixpence. The fifth edition was published in 1855, at the same price: it contains 98 pages printed in triple columns, besides an Index of Genera and Families, and is a marvel of cheapness. It is any thing but creditable to our British Coleopterists that such a Catalogue of the Coleoptera of Europe can be produced, and that a modern list of our British beetles cannot be procured at any price. We have so long heard that such a work is in preparation, without any signs of its coming, that we cease to believe the rumour. It is true that certain families have been

worked out by different hands, but we want a complete and cheap list like the Catalogue before us, for, with a few learned exceptions, the bulk of collectors are quite at a loss what to call their beetles, or how to arrange them, and many are hindered from becoming collectors at all.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & Co., PATERNOSTER Row, as well as of the Publisher.

CAPTURES.

Autumnal Sugarings, &c., Plymouth.—Petasia cassinea, taken at street lamps, but not common; Crymodes Templi, taken at street lamps, four specimens; Noctua Dählii, on the wing at dusk,

three specimens; *N. C-nigrum*, at sugar, common; *Agrotis Saucia*, at sugar, a good catch, several varieties; *A. Suffusa*, at sugar, common; *A. Segetum*, at sugar, common; *A. Corticea*, on walls (day time), not common; *A. Tritici*, bred, not common; *A. Puta*, at sugar, good supply; *A. Putris*, at sugar, rare; *Orithosia neglecta*, at sugar, very common; *Xanthia ferruginea*, at sugar, very common; *X. rufina*, at sugar, very common; *X. cerago*, at sugar, rare; *Glæa Spadicea*, at sugar, very common; *G. Vaccinii*, at sugar, very common; *Scopelosoma satellitia*, at sugar, not common; *Miselia oxyacanthæ*, at sugar, common; *Chariptera Aprilina*, at sugar, common; *Polia Chi*, at sugar, three specimens; *P. flavicincta*, at street lamps and on walls, common; *Epunda lichenea*, at street lamps (out of a dozen specimens of this species not one is fit for the cabinet; they are so deluded by the light, and are so impatient to get into the flame, that I have not succeeded in taking a perfect specimen from the lamps; they are, however, to be found at rest in the daytime on walls, and most of the collectors here breed a few every year). *Hadena Æthiops*, at sugar, good supply; *H. Protea*, at sugar, common; *Xylina rhizolitha*, at sugar, pretty common; *X. petrificata*, at sugar, not common; *Calocampa vetusta*, at sugar, common; *C. exoleta*, at sugar, common; *Philo-pyra pyramidea*, at sugar by hundreds, for two months; *P. Trago-pogonis*, at sugar, scarce; *Stilbia anomalata*, on the wing at dusk, rare; *Stenopteryx hybridalis*, among grass, common; *Hypeno-*

des albistrigalis, on the wing, rare; *Phæsyale psittacaria*, at sugar, common; *Cheimatobia dilutaria*, at sugar, common; *Depressaria pimpinellæ*, *D. pastinacella*, *D. applana*, *D. heracleana* (these four species were all beaten from thatch, *heracleana* being by this method the rarest, *applana* the commonest); *D. Alstræmeriana*, at sugar, common. The above list of species will appear to some persons to be rather peculiar, viz., *Geometræ* are not generally considered to come to sugar, and in some instances the rare species common, and the common rare.—J. J. READING, 42, Gibbons Street, Plymouth; November 4, 1856.

Captures in the North.—Knowing that many young entomologists think the collecting season is over as soon as the sun ceases to scorch the coat on our backs, I send this note to remind them that there is still work to do. October 22, at Dumfries, took *Petasia cassinea*, *Diloba cæruleocephala*, and *Ennomos Tiliaria*, at gas-lamps in the streets. October 26, at Carlisle, thought insects scarce, but found out why; the fact was there were several collectors before me stripping the lamps as they went along. I met with Mr. Hunter and friend; they had taken *Petasia cassinea*, *Pæcilocampa Populi*, and *Diloba cæruleocephala*. November 2, at Stourton Quarry, Cheshire, took *Pero-neæ mixtana* by smoking overhanging banks where *Erica tetralix* grows. It is necessary to have a friend to assist when smoking for insects. On the 2nd Mr. Cooke stood, net in hand, whilst I smoked the bushes, and

we secured about twenty beautiful specimens.—C. S. GREGSON, *Stanley* ; November 3, 1856.

Pupa-digging.—During the last few days' pupa-digging I have taken the following:

Ægeria Apiformis,
Smerinthus Tiliæ,
 „ *Populi*,
Cerura Vinula,
Notodonta Dictæa,
Acronycta Megacephala,
Tæniocampa instabilis,
 „ *stabilis*,
Hibernia progemma,
Biston hirtaria,
 „ *Betularia*.

— WILLIAM FARREN, JUNR.,
King's Old Gateway, Cambridge ;
 November 5, 1856.

COMMUNICATIONS.

Phlogophora empyrea.—Would you please to record in your next 'Substitute' my capture at sugar, near Lewes, of four *Phlogophora empyrea*, and my friends, who were with me, of thirteen others, beside the twenty-one which your Brighton correspondent mentioned as having been taken at the same place, making thirty-eight in all. Two of your correspondents from Brighton make some allusion to there being some foreign *empyrea* in Brighton. I have taken great pains to inquire of every entomologist in Brighton (with the exception of your two correspondents) if they have any knowledge in any way of any foreign *empyrea* being in Brighton, and they all emphatically deny and repudiate the idea of there being any here, and I think

it but justice that you should publish this statement (which is the truthful one) to correct the error which I am afraid your correspondents have *intentionally*, through a little jealousy in our having taken the insect, imposed upon you. If your correspondents have any clue to there being foreign *empyrea* in Brighton they ought, for their own credit and to clear themselves from suspicion, to make it known immediately.—GEORGE SMITH, 9, *King Street, Brighton* ; November 5, 1856.

Leiocampa Dictæa and *Dictæoides*.—Perhaps you could find room for the following in your next Number, as it is a matter of life and death. *Ventilation* v. *Suffocation*.—Having been informed by two eminent collectors of Lepidoptera, one in England and one in Scotland, who have had much experience in rearing moths, that they have never succeeded in bringing *Dictæoides* to perfection, and having noticed the bad success recorded by Mr. Cartmel and others, in attempting to rear *Notodonta Dictæa* and *N. Dictæoides*, perhaps the following hints may be useful. To succeed in rearing these species in confinement the greatest care is required with the pupæ. They should not be left in the earth. Prepare a large box, say 20 inches long by 15 wide and 12 deep, fill it half full with earth and make it very damp, cover the earth with a layer of dry moss, upon which place the pupæ ; then put another layer of dry moss upon them. Keep the box in a cool airy place till May, at which time it may be removed into a warmer spot to feel the heat of the sun. This

treatment I find best for all under-ground pupæ. — THOMAS CHAPMAN, *Glasgow*; November 3, 1856.

“*Descriptions of some species of Lepidopterous Insects belonging to the genus Oiketicus.*” By J. O. WESTWOOD, F.L.S.—The above is the title of a paper by Mr. Westwood, published in the ‘Proceedings of the Zoological Society of London for 1854.’ The genus *Oiketicus*, though it will sound strange to some of our readers, is here made to comprise the *Penthophora nigricans* of Curtis, and the *Psyche nigricans* of the ‘Manual,’ but the other species spoken of by Mr. Westwood are exotic. As the paper will probably be seen by few of our readers, and as it is unusually well written, the following extracts may be acceptable.

“It may probably be regarded as one of the settled axioms in Natural History, that there is not a single character which has been employed to distinguish any group of considerable extent which is not liable to be effaced, or even contradicted, by some one or more of the members thereof. Thus, whilst we have quadrupeds without legs, and birds without wings, the great division of annulose animals, characterised by the possession of articulated feet, contains great numbers of species which are entirely destitute of these organs; and in like manner the secondary division of the Annulosa, distinguished by the possession of wings in the final state (or the *Ptilota* of Aristotle), exhibits to us many species which never gain instruments of flight. Instances, however, in which both these grand characteristics are

absent, are of the greatest rarity. Of wingless *Ptilota* examples occur in most of the orders; as in the female glow-worm among the *Coleoptera*; the neuter ant and female *Mutilla* among the *Hymenoptera*; many of the smaller grasshoppers and locusts among the *Orthoptera*; some of the *Gerridae* among the *Hemiptera*; the genera *Boreus* and *Termes* in the *Neuroptera*; the female *Coccus* among the *Homoptera*; the genera *Cheonea* and *Borborus* among the *Diptera*; the *Stylopidae*, in the order *Strepsiptera*, and the females of various moths, as in the genera *Orgyia* and *Cheimatobia*, as well as in *Oiketicus* of L. Guilding. Amongst these exceptions it will be remarked that the majority are cases in which only the females are wingless, whilst all except *Coccus*, *Stylops*, and *Oiketicus*, possess articulated feet in the wingless state. These three genera would therefore be regarded, if we considered only the adult state of the females, as the most degraded instances of apiropodous *Ptilota*. But such an opinion cannot be maintained, since the early states of these insects exhibit as high an amount of organisation as those of any of the other insects in the orders to which they respectively belong, their peculiar characteristic being, that, whilst in the great mass of winged insects there is always a gradual evolution of structure by which at length legs and wings are developed, these particular individuals, destined ultimately to appear in such a degraded condition, not only gradually lose their powers of evolution but are subjected to a power of absorption by

which the limbs which they at first possessed are gradually reduced in size, and ultimately entirely lost, till the animal retains only the appearance of a short sluggish vermiform animal, in which not only are the wings and legs, but also the antennæ and the organs of the mouth, almost entirely obliterated, and even the articulated condition of the body nearly lost. Such is the apparently helpless condition of the females of a rather extensive group of moths, which have been long well known to German entomologists under the name of Sackträger, of which the smaller species constitute the genus *Psyche*, whilst some of the larger were formed by the late Rev. Lansdowne Guiding into the genus *Oiketicus*. The memoir on the two West Indian species observed by that author is contained in the fifteenth volume of the 'Linnean Transactions,' and is one of the most valuable contributions to the Science contained in the volumes published by that Society. Whilst the plates, however, which illustrate this memoir clearly prove the close affinity of the two insects, the males are very distinct in form from each other, and ought evidently to be regarded as types of separate subgenera. Of their intimate connection with the smaller European species, known under the generic name of *Psyche*, (but which have lately been distributed by M. Bruand, in an excellent monograph on the group, into various subgenera,) there can be no possible doubt: indeed, the largest British species cannot be separated generally from *Oiketicus*. Of *Oiketicus nigricans* males only were at first captured in this

country, which were illustrated by Mr. Curtis in his 'British Entomology,' under the name of *Penthophora nigricans*. Its generical relation with *Penthophora* is, however, entirely unfounded, whilst even its family connexion therewith is at least questionable."

Mr. Westwood then, after noticing the habits of the larva and male imago, proceeds to describe the female perfect insect as follows:

"The body has all the soft appearance of that of the larva of a wasp or bee, and is of a pale dirty whitish colour, except the upper side of the head and thoracic segments, which are brown; the first, fourth, fifth, sixth, seventh, eighth, ninth, tenth and eleventh segments of the body are furnished at the sides with a pair of spiracles, from which the tracheæ may be seen to radiate through the thin skin of the body. On the under side of the body is a row of nine small brown spots in the middle of the segments, commencing on the segment next to the head, those on the thoracic segments being close together between the minute rudiments of legs. The head has three deep circular impressions in front forming a triangle; the eyes appear to be merely irregular black spots, with the surface continuous and destitute of facets; the antennæ are rudimental, consisting of a minute exarticulated pair of appendages on the under side of the front of the head. Between the rudimental antennæ there is a transverse impression in the place of the mouth, which is alternately puffed out and withdrawn, but no opening is visible. The legs are

minute tubercles; the body is terminated by a small fleshy lobe or appendage, beneath which is a fleshy proleg or wart. The insect has a very strong vermicular motion, contracting segment after segment, considerably resembling in this respect the incipient pupa of some *Hymenoptera*. It twists the extremity of its body about in various directions, especially upwards, with considerable energy."

Mr. Westwood then proceeds to describe the exotic species, and *mirabile dictu*, upsets two already published names on rather singular grounds. Thus the *Oiketiscus elongatus*, Saunders, Trans. Ent. Soc. 43, becomes the *O. Saundersii*, Westwood.

"Considering it advisable to maintain for these curious insects the systems of specific names commenced by the Rev. L. Guilding, I have altered that proposed for the present species by its first describer, it being, moreover, inappropriate as applicable to other species agreeing with the present in structure."

Surely there is but one step from the sublime to the ridiculous. The opening paragraph of the paper represents the sublime, the sudden jump to an uniform termination in *ii* (our readers will easily think of a familiar expression that rhymes therewith), and the raillery of making the present Mr. Saunders a synonyme for *elongatus*, as though he were himself a type of "lengthened sweetness long drawn out," represents the ridiculous. But further, if there was any merit in Mr. Westwood's idea, we mean his *idea*, why was not *Nigricans* treated in a similar mode; or has

Mr. Westwood less desire to exalt Mr. Curtis than Mr. Saunders. Mr. Curtis was an entomologist of great repute before Mr. Saunders was heard of. We fear Mr. Westwood has committed a grave blunder.—I. I.

Remarks on Duplicates, &c.—

Allow me to remark upon a statement in the first leading article of 'The Substitute,' commencing at the 14th line, 2nd column, p. 1, which reads thus:—"yet the proper spirit is not to expect any return at all." Now this appears to me perfectly absurd. I have all I require of a species for my own cabinet, and why should I go many miles for more unless in the expectation of getting others, that I have not, in exchange for them, whether it be an *Apatura Iris* for a *Pieris Brassicae*, or a *Plusia Gamma* for a *Dasycampa rubiginosa* (for I consider all *Lepidoptera* equally valuable when duplicates, whether it be a *Chrysophanus dispar* or a *Vanessa Urticae*, and should be equally willing to give the former for the latter as the latter for the former, if I wanted either.) Am I to get boxes, then work hard to get insects to put into them, pay postage, and expect nothing but a "beggarly array of empty boxes." I say, sir, the proper spirit is to send as many, and as little injured, specimens as you can (even if you retain the worst examples of the species you take in your own neighbourhood for yourself) to your correspondent, expecting he will do the same; for I believe in every place there are what we call local species, consequently one can most likely replace them next season. I have been advised by Mr. Stainton to

get some posting-boxes made for sale upon my plan, which he highly approves, as ensuring the perfect security of the insects sent; therefore any one requiring them will please forward in postage-stamps the amount for such as they need. The following are the sizes (inside measurement) and prices, including postage, to the purchasers. Length $3\frac{3}{4}$ in., breadth $1\frac{1}{8}$ in., depth $1\frac{1}{8}$ in., and only 2d. postage, 1s.; length $4\frac{3}{4}$ in., breadth $2\frac{3}{4}$ in., depth $1\frac{1}{8}$ in., postage 4d., 1s. 6d.; both sizes will contain insects at the top and bottom.—E. S. NORCOMBE, 5, *Salutary Mount, Heavitree, Exeter*; November 4, 1856.

A New Nepticula Larva.—I fear I have been unjust; or Lancashire has turned over a new leaf (in this case a leaf of *Vaccinium Myrtillus*). Mr. Edleston has discovered a larva (not that of *Weaveri*) mining a tortuous gallery in leaves of *Vaccinium Myrtillus*. I had received a few weeks previously the same larva from Herr Schmid, of Frankfort, but the 'Intelligencer' being then defunct, and the season so near its close, I thought it was hardly of any use announcing the fact, as few would be disposed to turn out on the moors to seek for a species unknown as British. But I miscalculated the amount of energy latent in a Lancashire entomologist. Mr. Edleston, it is true, had recently visited Mr. Wilkinson, of Scarborough, whose name, this year, heads the list of Micro-Lepidopterological discoverers, and the impulse given on the Yorkshire coast was beneficially expended in ransacking the moors and dells of Lancashire. Mr.

Edleston writes, "The *Nepticulae* are widely distributed, and only want looking for."—H. T. STAIN-TON; November 6, 1856.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENEE'S NOCTUELITES.

[Continued from p. 48.]

Xylophasia.

Thanks to the elongate form of these insects, and their longitudinal markings, they have long been confounded with the *Xylinidæ*, and Mr. Stephens himself, though he rightly constituted for them a distinct genus, left them in the vicinity of the latter family. I have said in my essay how far from natural this arrangement appeared to be, and in my Index I assigned them the place which experience makes me retain for them now.

The larvæ of *Xylophasia* are of dull colours, shining, slightly vermiform, with the spots warty and shining: they always live concealed, and within reach of the roots or lowermost leaves of the plants on which they feed. These plants are especially *Gramineæ* or *Cyperaceæ*. We generally find them in spring, sometimes even in the middle of winter, and the perfect insects appear from June to August.

The genus *Xylophasia* is numerous in species, both European and Exotic: the former have for the most part been ill-studied by authors, and especially by French authors. These have pretended that *Lithoxylea* has been obtained

from the same larva as *Polyodon*, and this error has been dropped in order to commit a fresh one, by referring *Sublustris* as a variety of *Lithoxylea*. There might possibly be also two species mixed under *Rurea*. All these errors are rectified by degrees; but a good monograph of this genus, only advancing well-ascertained facts and accompanied by good drawings, especially of the larvæ, would be far from a useless work to entomologists. (Vol. I., p. 136.)

Dipterygia.

I now perceive that I was wrong in placing the European species, which composes this genus, in the genus *Cloantha*, of the family of the *Xylinidæ*, together with its ally *Conspicillaris*; but a more profound study of the characters, in convincing me of my error, has also shown me the impossibility of leaving *Pinastri* in the same genus with *Conspicillaris*. Neither can I place it in the genus *Xylophasia*, to which it is very closely allied. I have, therefore, adopted the genus of Mr. Stephens with the name borrowed from that given to the species by Hüfnagel, in allusion to the markings at the anal angle, which a little resembles a bird's wing. I do not, however, conceal that this genus does not yet appear to me to repose on well-defined characters.

According to the larvæ this genus appears to approach rather to *Axylia* than to *Xylophasia*; in fact, as in the former genus, the larva has the twelfth segment rather raised into a pyramidal hump. The spots are neither warty nor shining; and the larvæ

have not the vermiform aspect of the *Xylophasiæ*. They live concealed under the lower leaves, but not in the roots, nor do they construct oval cavities like these latter. (Vol. I., p. 146.)

Xylomyges.

This genus has always hitherto been classed among the *Xylinidæ*, and has only recently been brought here. It seems, however, much better placed here, and the Exotic species confirm this opinion. The larvæ of *Xylomyges* have not the earthy and vermiform appearance of those of *Xylophasia*, and have more resemblance to the larvæ of *Noctuidæ*. Those of the Exotic species especially resemble the larvæ of a *Triphæna* or a *Noctua*, but we do not find in them the wedge-shaped spots on the twelfth segment, which characterise so well these two latter genera. They always live, like those of the rest of the family, at the foot of low plants, but not buried amongst the roots. (Vol. I., p. 147.)

Laphygma.

This genus has hitherto been classed, in the system of European species, amongst the *Caradrinæ*, but it is evident that it cannot remain there, in spite of the superficial resemblance between *Laphygma exigua* and *Caradrina cubicularis*. The hyaline posterior wings, the crested abdomen, the form of the palpi, &c., all show that it cannot be united with *Caradrina*. The genus *Laphygma* is composed of species very nearly allied to one another, and which, though at present not numerous, are found nearly all over the globe. The

larvæ are not yet well known, especially that of our European species, which is, however, as M. Daube tells me, very common in corn-fields around Montpellier. I know not whether it multiplies there to an extent to be destructive, as is the case with its congener *L. frugiperda* in America, nor whether it has the same habits; unfortunately I have not been able to obtain from the entomologists of the South of France complete information of the larvæ which are found exclusively there, and I have more than once regretted the difficulty I have encountered from this want of precision. (Vol. I., p. 157.)

Neuria.

For a long time the species which form the type of this genus was considered nearly allied to *Dianthæcia* on account of a certain resemblance of marking between it and *capsincola*, but in fact there is no other resemblance to it in any of its stages. The larvæ do not feed in capsules, and the chrysalis has no ventral appendage. (Vol. I., p. 166.)

THE SPORTSMAN AND THE ENTOMOLOGIST.

The ex-member for West Gloucestershire, while not otherwise engaged, is harmlessly occupied in sending to the 'Field' newspaper reminiscences of his sporting life, from which we take the following rather amusing adventure:—

Not many years ago, during a beautiful afternoon in the month of August or September (at this moment I forget which), I was aware in one of the royal forests

of a fat buck. This buck was very shy, and, like all deer the moment they are worth killing, he had taken to hide in a thick wood, only diverging from it to feed at dusk in the evening, by such paths as he knew would, for the time being, give him the command or the wind of any ambushed rifle that might be ready for his destruction. The wilder the animal of chase, the more beauty there is in his attainment; and I, of course, became doubly anxious to procure this venison. Oh! that forest, that wild and graceful forest! how I have haunted its woods and its heaths, and furze brakes, and in its solitude never felt myself alone! In the wood of which this buck had become almost the sole tenant, there was a sweet grassy ride that he was very fond of. The wind favoured the position I wished to take; so, creeping under cover at a spot which commanded the game either way, and not a hundred yards from the open forest, I lay concealed, ear and eye on the alert for anything worthy of observation, and in the hope of some "shadow" to herald "the coming event."

My watch for the wary buck continued, when (as the lengthened shadows told me that the sun was far down in the west, and the evening was beautifully still) my attention of course became concentrated on the business of the hour. "Hark!" 'tis the startled note of a blackbird, sprung by something of which it is afraid. This is no deer; but it may be a fox. I trust in all that is good that no man's footsteps hitherward come. Such, indeed, were the thoughts that entered my head,

and such my aspirations. All then for a time remained silent; and I settled in my own mind that a fox had disturbed the black-bird. Hark! again, the gentle rustle of a bough; and presently the sharp shake of its leafy end, as if a buck, whose horns were forward and hardened, had hit a twig beyond the reach of his mouth, to bring its verdure lower down, that he may browse upon it. A dead silence, a little rustle, and a shake again on the same spot, just at the corner of the open forest, but still quite within the cover. "It must be the buck, and can be nothing else." A bough of the copse wood then leaned toward and into the woodland glade, but flew back; it had evidently bent down from some pressure from within. "Its the buck; so here goes!" Cautiously and steadily, with stealthy motion, avoiding all jerk or sudden movement, the rifle rose to my eye, and kept its level at the spot where every instant I expected to see the buck's head. The bough bent again, the leaves rustled still more, and in the same place. "It can only be the buck at browse; and now I have the view." A dull surface appears in the middle of the bush, the hue of a deer's neck, and it moves up and down; yet (perverseness personified) I can neither see ears, nor horns, nor eye, nor anything to guide me to spine or brain. Shall I shoot at a venture? Caution, from long experience, as well as habit, whispered "No." "Well," I thought to myself, "I have seen old women select the moment when horses are coming in to cross a racecourse: I have seen, man, woman, and child, where you

least expect to find them; and though I know this can't be anything but a buck, for the love of heaven I will not pull the trigger." "Now for his heart!" and I dared hardly breathe, lest my finger should touch the light trigger. The boughs then burst wide, and out came a buck—an old buck too—but such a buck, that I would rather have died than have made venison of! *It was a man*—a benign-looking brisk old man, in a dun-coloured wide-awake hat, and drabbish dress all over, in Pickwickian cut and fashion, even to shorts and ankle-gaiters, which only just met his very well-made calves.

"Good God, sir," I exclaimed, bursting out of the bushes on his startled view, "you very nearly lost your life, and beguiled me into murder."

"Sir," exclaimed the elderly gentleman, in no small alarm, "why, how and wherefore so?"

"Simply thus; you have been personating a buck in and about the bush so long, that my arm has been aching in holding my rifle at the level of your body, the trigger so light that had I sneezed I must have shot you."

"Dear me, sir," he replied. "I will instantly betake myself out of harm's way," and, so saying, disappeared round the corner, and left me most thankful that I had done no murder.

My search for the buck that evening was useless; and on meeting the keeper at a given spot I asked him who this old gentleman was.

"A Flapper," he replied, in the most business-like and concise way.

"A Flapper!" I rejoined in as-

tonishment, thinking it a very odd definition of the respectable old gentleman I had just seen. "What the devil do you mean by a 'Flapper?'"

"One of the gentlemen, sir, what comes down to the inn here a catching of insects. Lord, sir, they think as much of a fly or a grub as we do of the best buck in the forest; and goes out by night, too, as well as by day, a rubbing old bark of trees with sugar."

"Oh, ho," I remarked to myself, "the Entomological Society." Long time and success to them and their research; may every man with a rifle, in forest or woodland, be as sure of his buck as I have been, before he pulls the trigger.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 6.]

SATURDAY, NOVEMBER 29, 1856.

[PRICE 2d.

THE CABINET QUESTION.

THERE is nothing perhaps more embarrassing to a young collector than to determine what to do with his insects after he has taken them and set them out. He probably appropriates as a receptacle for them the first thing he meets which he can convert to the purpose,—brother's hat-box, sister's work-boxes, a moiety of mama's cheffonier, or papa's desk, have all served their turn as apologies for a cabinet. The first fault of a beginner is that he does not pass the pins sufficiently far through the insects, and they are thus still less able to penetrate into the wood than they would be if they went further through the specimens; consequently in a little time he finds the delights of his eyes pirouetting across the boards with very inappropriate partners, accompanied by a number of little attendants, which, after the universal custom, always wait upon the great for the sake of a living. Remember then to line your receptacles, whatever they are, with

cork, which you may procure of any of the insect dealers, in sheets or pieces, ready for use, and pass the pins so far through the insects that they may have a firm hold in the cork. And to keep down the mites fix a lump of camphor in each corner, or put in a few drops of Borneote of Petroline, if you don't dislike the smell of tar: the mites cannot abide it. Still the question remains, what are the receptacles to be? Chip-boxes, in which toys are sold, do very well for collecting in, and square paste-board-boxes, about 2 inches deep and with moveable lids, serve for keeping insects in. On the Continent the general custom is to keep collections in such boxes. We have heard of one entomologist who has a most extensive collection all in such boxes, each holding but a single species, and all labelled on the back, and arranged on shelves, so that any species can be referred to at once, a good plan it may be for one with plenty of time, but we do not recommend such a subdivision. Wooden boxes 3 inches deep and 16 by 14 inches square, opening in

the centre of the depth on a hinge, and defended by a *rabbit* all round inside to keep out the dust, are most generally used in this country, and are very serviceable. But the best kind of receptacle is undoubtedly a cabinet of drawers, each covered with glass fixed in a moveable frame; the advantages being the ease with which the insects can be viewed without danger of accident by touch, and the better preservation attained by the total seclusion from the air and dust. The disadvantage pertaining to a cabinet is its great cost; but this, although most of us have suffered from it, is not really necessary. We know of instances where fabulous sums have been paid for cabinets—more than a guinea a drawer; and a beginner hearing such things, and finding that extravagant prices are still required by the makers, hesitates at spending £40 or £50 for a mere case, or gives up all idea of making a collection. We are convinced that hitherto entomologists have paid a fancy price for their cabinets; that good, sound ones, not fancy articles, could be made for half the usual charges, and that the maker who first introduces such will be a benefactor to the rising race of entomologists, and will doubtless reap his reward.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & Co., PATERNOSTER Row, as well as of the Publisher.

Communications Received.

S. R. MACDONALD and TIMOTHY BOBBIN, declined.

A. NAISH.—Opinions differ: some persons are equally delighted.

R. WEAVER.—Are the duplicates for sale or exchange?

Several communications only wait for room.

DUPLICATES AND DESIDERATA.

J. B. HODGKINSON has the following insects for exchange.

DUPLICATES.

Thecla Rubi,
Polyommatus Alsus,
Argynnis Euphrosyne,
 Selene,
Melitæa Artemis,
Vanessa C-Album,
Satyrus Davus,
Procris Statices,
Lithosia Mesomella,
Euthemonia Russula,
Orgyia Fascelina,
Pœcilocampa Populi,
Hepialus Velleda,
Petasia Cassinea,
Acronycta Menyanthidis,
 Myricæ,
 Ligustri,
Leucania Littoralis,
Miana Literosa,
Luperina Connexa,
 Albicolon,
Xylophasia Scolopacina,
Triphæna Ianthina,
 Interjecta,
Noctua Leucographa,
 Dahlîi,
 Depuncta,
Chersotis Haworthii,
 Subrosea,
 Porphyreia,
Spælotis Præcox,
Agrotis Cursoria,
Trachea Piniperda,
Tæniocampa Opima,
 Miniosa,
Orthosia Ypsilon,
Anchoscelis Lunosa,
 Litura,
Euperia Fulvago,
Xanthia Aurago,
Dianthæcia Conspersa,
 Capsincola,
 Cucubali,
Polia Serena,
 Chi,
Epunda Lichenea,
Hadena Adusta,

Hadena Thalassina,
 Glaucia,
 Protea,
Aplecta Occulta,
 Advena,
 Tincta,
Thyatira Derasa,
Calocampa Vetusta,
Cucullia Asteris,
 Chamomillæ,
Cloantha Solidaginis,
Anarta Myrtili,
 Cordigera,
Plusia Interrogationis,
 Inscripta,
 Festucæ,
 Iota,
Erastria Uncana,
Chlorochroma Viridaria,
Epione Parallellaria,
 Apiciaria,
Ennomos Tiliaria,
Macaria Notataria,
Fidonia Plumaria,
Eupisteria Hepararia,
Nyssia Zonaria,
Tephrosia Punctularia,
Anaitis Imbutaria,
Coremia Erutaria,
 Salicaria,
 Propugnaria,
Harpalyce Ruptaria,
 Popularia,
Ypsipetes Impluviaria,
Phæsyale Cæsiaria,
Cheimatobia Filigrammaria,
Eucosmia Undularia,
Melanippe Annicularia,
Emmelesia Hydraria,
 Albularia,
Xerene Albicillaria,
Cabera Exanthemaria,
Eupithecia Linaria,
 Begraudaria,
Acidalia Sylvaria,
 Blomeraria,
 Nitidaria,
Amphysa Prodromana,

Sericoris Micana,
Mixodes Schulziana,
Cnephasia Lepidana,
Clepsia Rusticana,
Phoxopteryx Uncana,
 " *Myrtillana*,
Pædisca Occultana,
Ephippiphora Turbidana,
 " *Signatana*,
 " *Ephippiana*,
Coccyx Vacciniana,
Heusimene Fimbriana,
Retinia Sylvestrana,
Stigmonota Coniferana,
 " *Redimitana*,
Choreutes Scintillana,
Cochylis Stramineana,
Crambus Margaritellus,
Eudorea Murana,
Nephopteryx Abietella,
Ephestia Elutella,
Exapate Gelatella,
Semioscopis Avellanella,
Tinea Ferruginella,
 " *Ochraceella*,
Micropteryx Unimaculella,
Nematopogon Metaxellus,
Eidophasia Messingiella,
Gelechia Pernigrella,
 " *Sororculella*,
 " *Desertella*,
 " *Mundella*,
Æchmia Haworthella,
Argyresthia Sorbiella,
 " *Conjugella*,
 " *Retinella*,
 " *Brockella*,
Elachista Apicipunctella,
Lithocolletis Emberizæpen-
 nella.

DESIDERATA.

J. B. Hodgkinson wants the following species.

Colias Hyalæ,
Thecla Betulæ,
 " *Pruni*,
 " *W-Album*,

Polyommatus Arion,
Vanessa Polychloros,
Apatura Iris,
Pamphila Actæon,
Trochilium, any,
Sesia, both species,
Procris Globulariæ,
Eulepia Cribrum,
Lithosia Helvola,
 " *Complana*,
 " *Stramineola*,
 " *Rubricollis*,
Nudaria Senex,
Phragmatobia Urticæ,
Clisiocampa Castrensis,
Endromis Versicolor,
Limacodes Testudo,
Platypteryx Hamula,
 " *Unguicula*,
Ptilodontis Palpina,
Stauropus Fagi,
Notodonta Dictæoides,
 " *Chaonia*,
 " *Dodonea*,
Clostera Curtula,
Acronycta Strigosa,
 " *Auricoma*,
 " *Aceris*,
Diphtera Orion,
Ceropacha Fluctuosa,
 " *Ridens*,
 " *Ocularis*,
Cymatophora Oo,
Hydrilla Caliginosa,
Leucania Pudorina,
 " *Obsoleta*,
 " *Straminea*,
Nonagria Extrema,
 " *Hellmani*,
 " *Paludicola*,
 " *Arundinicola*,
Miana Expolita,
Apamea Ophiogramma,
Luperina Cespitis,
 " *Furva*,
Crymodes Templi,
Noctua Ditrapezium,
Chersotis Agathina,

Agrotis Saucia,	Aventia Flexularia,
„ Lunigera,	Aspilates Citraria,
„ Aquilina,	Nyssia Hispidaria,
„ Ripæ,	Boarmia Consortaria,
„ Cinerea,	„ Roboraria,
Neuria Saponariæ,	„ Abietaria,
Heliophobus Hispida,	Cleora Viduaria,
Tethea Retusa,	Tephrosia Laricaria,
Cosmia Diffinis,	„ Extersaria,
„ Pyralina,	Coremia Ligustraria,
„ Affinis,	Anticea Rubidaria,
Cirredia Xerampelina,	„ Berberaria,
Xantholeuca Croceago,	Harpalyce Picaria,
Dianthecia Carpophaga,	„ Sagittaria,
Polia Dysodea,	„ Marmoraria,
Hadena Lutulenta,	Lobophora Hexapteraria,
„ Genistæ,	Acasis Viretaria,
„ Contigua,	Triphosa Certaria,
„ Atriplicis,	Scotosia Rhamnaria,
„ Rectilinea,	„ Vetularia,
„ Chenopodii,	Phibalapteryx Vitalbaria,
Cucullia Verbasci,	„ Tersaria,
„ Scrophulariæ,	Melanippe Rivaria,
„ Absinthii,	Emmelesia Tæniaria,
„ Lychnitis,	„ Bifasciaria,
Aporophila Australis,	Xerene Adustaria,
Heliothis Peltigera,	„ Procellaria,
„ Dipsacea,	Ephyra Poraria,
Brephos Notha,	„ Orbicularia,
Acontia Luctuosa,	Eupithecia Coronaria,
Agrophila Sulphurea,	„ Debiliaria,
Pyralis Glaucinalis,	„ Innotaria,
Aglossa Cuprealis,	„ Piperaria,
Ebulea Verbascalis,	„ Succenturiaria,
„ Cilialis,	„ Irriguaria,
Scopula Ferrugalis,	„ Venosaria,
Odontia Dentalis,	„ Togaria,
Pionea Margaritalis,	„ Consignaria,
Spilodes Sticticalis,	„ Subnotaria,
„ Cinctalis,	Dosithea Bisetaria,
Botys Lancealis,	„ Rusticaria,
Mecyna Asinalis,	„ Ornataria,
Nola Strigulalis,	„ Immutaria,
Phorodesma Bajularia,	Acidalia Marginepunctaria,
Chlorochroma Vernaria,	„ Perochraria,
Pericallia Syringaria,	„ Cæspitaria,
Epione Advenaria,	„ Subsericearia,
Ennomos Erosaria,	„ Inornaria,

Acidalia Degeneraria,
 Timandra Emutaria,
 Ania Emarginaria,
 Siona Dealbaria,
 Pachynemia Hippocastanaria
 Minoa Euphorbiaria,
 Halias Quercana,
 Ænectra Pillerana,
 Peronea Maccana,
 „ Umbrana,
 Spilonota Pauperana,
 Sideria Achatana,
 Sericoris Littorana,
 Mixodia Hawkerana,
 Phtheochroa Rugosana,
 Phoxopteryx Upupana,
 Ephippiphora Obscurana,
 Retinia Turionana,
 Carpocapsa, all of them,
 Opadia Funebrana,
 Catoptria Pupillana,
 „ Citrana,
 „ Westwoodiana,
 Lobesia Servillana,
 Eupœcilia Ambiguana,
 „ Simplana,
 Chrosis Andouinana,
 Argyrolepis Dubrisana,
 „ Æneana,
 Cochylis Dipoltana.

These are a few of my wants: there are of course a great many of the rarer species not noted, and I have all, or nearly so, of the species enumerated as wanting. I have some hundreds of species, besides those marked, for exchanging with.—JAMES B. HODGKINSON, 16, Bolton Street West, Preston.

[N.B. Change of residence.]

CAPTURES.

Lepidoptera, &c., near Wells.—
 On the 4th of September I took a

trip to the hills round Wells, and there succeeded in capturing a few of the local species, including the following:

Hipparchia Semele,
 Polyommatus Ægon,
 „ Corydon,
 „ Agestis.

I have also found the larvæ of *Sphinx Ligustri* and *Smerinthus Populi* in great abundance this season, and several specimens of *Gryllus viridissimus* have been found here.—JOHN DRAKEFORD, Sidcot School, near Weston-super-Mare, Somersetshire; November 10, 1856.

Lepidoptera at Looe, &c.—I send you a list of *Lepidoptera* taken by me during a six weeks' stay at Looe, a small fishing town on the south coast of Cornwall, about eighteen miles west of Plymouth. The whole coast of this tract of Cornwall, from Rame Head on the east to Deadman Point on the west, is of the clay-slate formation, and rises into considerable cliffs, interrupted here and there by the mouths of small streams, or hollowed out into snug coves, in some of which the ceaseless action of the waves upon the rocks has elaborated a beach, of what appears to be sand, but is really comminuted slate. In such nooks as these, completely shut out from the world, the eager entomologist forgets his calling. He lays down his net and uncovers his head, and in Nature's temple, with the rock behind and around and the sea in front, he lifts up his heart to "The Lord of all Power and Might, the Author and Giver of all Good, who made the Earth and the Sea and all things that are therein." This done, if he be a swimmer, he

whips off his clothes and dashes in through the sparkling surf laughing and even roaring with the laughing and roaring waves. O the joys of such a bath, never to be forgotten! He turns a lingering look on the scene behind: with a light heart and a brisker step once more mounts the cliff, and is soon up to his middle in ferns and foxgloves. The cliffs were not, however, my only haunt. A small stream empties itself into the harbour at Looe, which at high tide becomes an arm of the sea, and is clothed on both sides with wood, chiefly oak, for two or three miles from its mouth. My leisure time was pretty equally divided between these woods and the cliffs, as the list I send will show. The nomenclature is Doubleday's for the Macro-Lepidoptera and the Tortricina, Wood's for the Crambina, and Stainton's for the Tineina. The date, wherever given, refers to the first capture of that species; and those captures without a date were all between the last week in June and the first in August. The first specimen of *Trochilium Ichneumoniforme* was found on a bank close to the sea where the coast was low: it had not long emerged from the pupa-case, which was lying beside it. I afterwards took two on the wing among some Neuropterous insects similarly coloured, from which it was very difficult to distinguish them. *Arctia Villica* was flying in the heat of the day on the cliffs, and a glorious sight it was to me, who saw it for the first time. The capture of *Stauropus Fagi* has been already recorded in the 'Intelligencer.' I tried for *Diptera*

Orion with sugar in the wood, where I took three in the daytime, but in vain. Indeed, I was altogether disappointed in the sugar, taking nothing by it but *T. Batis*, *P. Herbida*, *H. Thalassina*, and other common things. *Stenia Punctalis* and *Asopia Flammealis* I found frequently on the cliffs here, and also near the Logan Stone and the Land's End, where I also met with *P. Ægon* and *A. Selene*, the former confined to about half an acre of heath near the sea. *Botys Lancealis* was not uncommon in the grassy outskirts of the same wood, in the inner tracts of which I took *Hypena Crassalis* and *Hypenodes Albistrigalis* in tolerable plenty. I was struck with the beautiful dark varieties of *A. Prunaria*, (all males, the females being generally very light, some with a darker border); and *B. Repandaria* with the black fascia was about as common as the paler variety. *E. So-brinaria* (?) was taken on the granite rocks towards the Land's End. The fewness of the *Tortricæ* and *Tineæ* in the woods, compared with those of Worcestershire, was very noticeable. Of larvæ I took very few; but I think I have about a dozen *Cucullia Scrophulariæ* pupæ from larvæ taken on the Water Betony: they were both blacker and yellower than *Verbasci*, of which I also found several on the Mullein. One day I found two yellow *Bombyx* cocoons, evidently male and female, linked together and hanging on a reed near the sea. My expectations were raised high; but they turned out to be only *C. Neustria*. I also took the larva of *L. Monacha*, and, I believe,

of *O. Gonostigma*, but the former came out cramped during our journey home, having been in pupa exactly fourteen days, and the latter died.

Lepidoptera at Looe, &c.

Colias Edusa, Aug. 5
Polyommatus Argiolus, July 23
 „ *Ægon*, July 2
Argynnis Paphia
 „ *Selene*, July 2
Melitæa Athalia, June 25
Vanessa Atalanta, June 25
Cynthia Cardui, July 17
Satyrus Semele, July 2
Pamphilæ Linea, July 29
Trochilium Ichneumoniforme,
 July 30
Sphinx Ligustri, June 27
Arctia Villica, June 23
Orgyia Pudibunda, June 23
 „ *Coryli*, June 26
Lasiocampa Quercus, Aug. 3
Stauropus Fagi, June 25
Acronycta Ligustri, June 30
Diphthera Orion, June 25
Miana Furuncula, July 29
Hadena Thalassina, July 5
Aplecta Herbida, July 5
Thyatira Batis, June 25
Erastria Fuscua, June 20
Pyrausta Punicealis, July 20
 „ *Cespitalis*, July 14
Stenia Punctalis, July 2
Asopia Flammeal, July 12
Ebulea Crocealis, July 15
Botys Lancealis, June 27
 „ *Flavalis*, June 27
Stenopteryx Hybridalis, July 20
Hypena Crassalis, June 23
Hypenodes Albistrigalis, July 17
Hemithea Cythisaria
Angerona Prunaria, June 27
Macaria Notataria, July 24
Fidonia Atomaria, June 25
Boarmia Repandaria (banded)
Cleora Lichenaria, July 2

Tephrosia Crepuscularia, July 19
 „ *Extersaria*, June 27
Gnophos Obscuraria, July 29
Eusebia Bipunctaria, July 17
Coremia Propugnaria, June 23
Anticlea Sinuaria, July 23
 (worn)
 „ *Rubidaria*, June 23
Harpalyce Fulvaria, June 23
 „ *Popularia*, June 24
Eucosmia Undularia, June 26
Venilia Macularia, June 23
Melanippe Rivaria, July 11
 „ *Amnicularia*, July 19
Emmelesia Rivularia, July 25
 „ *Hydraria*, June 28
 „ *Decoloraria*, July 25
Zerene Adustaria, June 30
Bapta Temeraria, June 23
Eupithecia Debiliaria, June 27
 „ *Plumbeolaria*, June 27
 „ *Sobrinaria* (?) July 1
 „ *Centaurearia*, July 1
 „ *Pumilaria*, July 25
Dosithea Immutaria, June 30
 „ *Reversaria*, July
Acidalia Ossearia, June 29
 „ *Sylvaria*, July 5
Halias Prasinana, July 4
Tortrix Xylosteana, June 29
 „ *Branderiana*, June
Amphysa Gerningiana
Dictyopteryx Læßingiana, July
Noctocelia Udmanniana, July 18
Orthotænia Striana
Bactra Lanceolana
Hypermezia Angustana
Batodes Angustiorana
Pædisca Profundana
Endopisa Nebritana, June 27
 „ *Pisana*, June 27
Stigmonota Redimitana, July
 „ *Trauniana*, July
Dicrorampha Artemisiana, July
Catoptria Ulicetana, July
 „ *Hypericana*, July
 „ *Hohenwarthiana*, July
Lobesia Reliquana

Xanthosetia Hamana, July 19
 Crambus Pinetellus, July 5
 " Cerusellus
 " Culmellus
 " Pygmæus
 Phibalocera Quercana, July
 Ilythia Sociella
 Phycita Ornatella
 " Nebulella
 " Binævella
 " Consociella
 " Bistriga
 Plutella Nimorella
 " Dentella
 Cerostoma Costella
 " Radiatella
 Elachista Cygnipennella
 Chrysocorys Festaliella
 Butalis Grandipennis
 Gelechia Terrella
 Œcophora Flavifrontella
 Chrysoclista Flavicaput
 Gelechia Cinerella
 Gracilaria Swederella.
 —E. HORTON, *Wick, Worcester*;
November 12, 1856.

COMMUNICATIONS.

A New Clap-Net.—Having met with a friend, a manufacturer of telescopic tubes, &c., I have induced him to make for me some handles for a Clap-Net, thinking to obtain one more convenient than the one I have hitherto used. Now it is finished I find it so superior to what I had at first anticipated that it has induced me to lay a description of it before your readers, thinking, perhaps, that some of them would like to have the same convenience (at so little cost) for themselves. The whole length, when closed, is 24 inches, the diameter of each han-

dle being $\frac{1}{2}$ -inch, and when drawn out it reaches 4 feet 10 inches. It is made in three joints; the second and third sliding into the first. The third joints, which of course are smaller than the others, are made of flexible canes, and joined at the point by vulcanised India-rubber. When closed it is very portable, and when opened it is both firm and strong, forming the most compact thing of the kind I have ever yet seen; the whole cost being 4s. 6d. If any of your readers should like any more information respecting it, I shall feel a pleasure in sending them more minute particulars, or obtaining for them the article itself. — J. B. STONE, *Lupin Street, Birmingham.*

Forcing Lepidoptera.—I wish to know if any of your readers have noticed a similar case to the following:—On the 17th of September I had some larvæ of *Vanessa Atalanta* that became pupæ, and which I suspected would so remain until the following spring, but on placing them in a warm room, they emerged on the 5th of November. — THOMAS CLARKE, *Bedern Bank, Ripon*; *November 13, 1856.*

How to Catch a Falling Larva.—I have heard a great many entomologists complain that when they try to take a larva from a plant it very often falls to the ground and cannot be found; now when it drops, it generally fastens a fine thread or silk to the bough or leaf it falls from and slides down it to the ground, but if the person passes his hand under the place the larva was in, when first seen, it will come in contact with the thread, and having found the

thread it is easy to trace its course to the ground, and the poor larva becomes a captive. I have found this plan answer in most cases, and think others may derive benefit from it, as many a rare insect is lost by losing the larva. If you think this is worth inserting in the 'Substitute,' you are at liberty to do so.—E. R. PRIEST, 14, *Parliament Street*; November 22, 1856.

NEW BOOKS.

ELEMENTS OF ENTOMOLOGY; an Outline of the Natural History and Classification of British Insects. By W. S. DALLAS, F.L.S. Nos. 1, 2 and 3, 6d. each. Van Voorst, 1, Paternoster Row.

We have waited till this work was getting rather advanced, before bringing it under the notice of our readers. It is never fair to judge of unfinished works; even now, who knows how far numbers 11, 12 and 13 may disappoint the expectations we have formed by a perusal of numbers 1, 2 and 3. Besides, the opening chapters of all books are apt to be tedious. The novelist, to be sure, often appears to avoid this, by commencing at the first start with some very animated conversation, and then after he has kept up the interest for some ten or twelve pages, he proceeds to tell you all the histories and antecedents of the persons whose conversation has already interested the reader. But the writer of a scientific work could hardly treat his subject in this way; he *must* begin at the begin-

ning, and so we presume Mr. Dallas thought, when he devoted his first chapter to the consideration of the enquiry, "What is an Insect?" Having satisfied us on this head, he proceeds to give us a chapter "Of the Structure of Insects in general," embellished with a wood-cut representing the head and mouth of a beetle. The mouth, in insects, as in most animals, is an organ of great importance, and being the entrance through which the stomach receives its supplies, is necessarily an important consideration in animal economy. Almost every order of insects has the mouth constructed in a different way, so that we really feel surprised to find how great is the variety of modifications which the same organs undergo, in order to fit them for obtaining nutrition for the insect from dead or living organizations, in a liquid or solid state.

The next chapter introduces us to the "Sexes and Transformations of Insects," and though so much has been written about "transformations," and we have such excellent notices on this head in Kirby and Spence's 'Introduction to Entomology' (which probably, in its cheap form, is possessed by every one of our readers), still, in a systematic work like this of Mr. Dallas, we do not see how he could have avoided some notice of that mystery in insect-life.

Then follows a chapter of 'Classification and Nomenclature,' and we think we show no great amount of penetration, in prophesying that it will not give entire satisfaction to every one, but we do not think that this will

be any peculiarity of Mr. Dallas' arrangement, as it is the common fate of all systems of classifications to cause dissatisfaction to some, and were this not so, man would scarcely be human.

At Chapter V. we come to the Coleoptera or Beetles, a class of insects which during the next three months are more sought after than any others, and here we will give an extract to enable our readers to judge for themselves; for after all, they can better judge of the nature of the book from a sample than from anything we might say of it. We might have a bias for, or against the author, and might therefore, unwittingly, speak too highly, or else under-rate the usefulness of his book.

"Besides the common tiger-beetle (*Cicindela campestris*) just referred to which may be met with in almost all sandy or gravelly places, and several other species of the genus *Cicindela*, which are more limited in their distribution, we have in Britain an immense number of other predaceous beetles, the scene of whose exploits is on the ground. Of these, a great number agree with the beautiful insect above described in so many important characters, that they are considered to form a single great group, the tribe of the *Geodephaga*, or Ground Predaceous Beetles. In all these insects the outer lobe of the maxillæ forms a slender-jointed organ, resembling a short palpus of two joints, which intervenes between the true maxillary palpus and the biting part of the maxilla,—hence they have been described as possessing six palpi. The maxillæ themselves terminate in a sharp

hooked point, which in some cases (as in the *Cicindela*) is moveably articulated to the body of the organ. The legs are constructed solely for running upon solid surfaces, and the tarsi are all composed of five joints.

"Unlike the *Cicindela*, which, as we have seen, delight in the brightest sunshine, the majority of these insects are nocturnal in their habits, and keep themselves concealed during the day under stones and clods of earth, in the clefts of banks or beneath the fallen leaves of trees in woods, where they require to be diligently sought by the entomologist. At nightfall they come forth in search of their prey, which they pursue for the most part on foot, as they appear to have much less power of wing than the tiger-beetle.

"There are, however, many exceptions to the generally nocturnal habits of the insects of this group,—a great number of the smaller, brilliantly metallic species are almost as active as the *Cicindela* under the hottest sun, and take wing with nearly equal facility. Many of these lovely little creatures may be found in profusion running about on the mud at the margins of ponds, when these begin to dry up in summer, whilst others, such as the species of the genera *Amara* and *Pæcilus* are so abundant on our garden-walks that they are well known, even to children, under the name of *sunshiners*. Most of the more brilliant species, in fact, appear to be more or less diurnal in their activity, whilst those which exhibit black or dark colours select the congenial obscurity of night for their prowlings.

"The larvæ of most of the species are of a roving disposition, and wander about like the perfect insects under cloud of night in pursuit of their prey. Their whole upper surface is covered with a horny skin, which is harder upon the head and prothorax; the head is armed with a pair of formidable jaws, and the legs are well formed and stout. They are excessively gluttonous, and destroy great quantities of caterpillars, and the larvæ of other herbivorous insects, which indeed constitute the principal food of most of the predaceous beetles, both in their larva and perfect states, although in this respect they are by no means particular, but will feed without the slightest remorse even upon individuals of their own species.

"The largest of the common British beetles of this group are the species of the genus *Carabus*, several of which are an inch or more in length. I shall only refer to two of the most abundant and generally distributed of these, — the *Carabus hortensis*, which is exceedingly common in gardens, and the *Carabus violaceus*, which inhabits the open country in almost equal profusion. Both these beetles are full an inch in length, and of a black colour. The former has the margins of the thorax beautifully tinted with a metallic purple; the elytra are of a fine coppery or brassy tint, delicately grained all over, and exhibiting three rows of small impressed dots. It is found abundantly in the gardens of the suburbs of London, and in those parts where the gravel footpaths have not yet given way to paving-stone, nothing is more common than to see

these insects lying dead upon the paths in the morning, crushed beneath the unheeding heels of nocturnal wanderers.

"The *Carabus violaceus*, from inhabiting the open fields and heaths, is not liable to have the thread of his existence cut short in this unceremonious manner, and he often continues his wanderings under the bright morning sun. This fine beetle is entirely of a bluish black, with the whole upper surface finely grained; the margins of the thorax have a delicate violet tinge, and the outer margins of the elytra are tinted with coppery-purple."

Perhaps, when Mr. Dallas impinges upon the water-beetles, we may give a further extract.

MR. KINGSLEY'S SEASIDE BOOK.

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GLAUCUS; OR, THE WONDERS OF THE SHORE.

By CHAS. KINGSLEY, F.S.A.,

Author of
"Westward Ho!" "Hypatia," &c.

Third Edition, corrected and enlarged.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 7.]

SATURDAY, DECEMBER 6, 1856.

[PRICE 2d.

WINTER WORK.

MANY young collectors think that when winter comes there is no more to be done out of doors. We used to think so too once, but we have learned that it is a great mistake; and although the idea that out-door employment ceases when the net is laid aside is not so prevalent as it used to be, yet collectors are not sufficiently impressed with the necessity of searching during the winter for insects that they will not get half so easily otherwise.

By Lepidopterists hosts of pupæ are to be obtained by digging gently at the roots of trees, and at the bottom of fences and walls. The stooping necessary often makes the back ache, but the prizes gained make the heart glad. There is a pleasure in turning out a pupa that must be felt to be appreciated. When you have dug round the tree, see if there be any loose bark upon it, if so, there is probably a pupa there; it may be in a cocoon: then see if there be any thick

moss on the trunk or the spreading roots; ten to one there are some *Bombyces* laid up under it. You search a tree in this way and possibly find nothing; go on to the next, and the next, nothing disheartened, remembering that, according to the doctrine of chances, it could be mathematically demonstrated that the longer you are unsuccessful the greater the probability of your ultimate good fortune. If you shake carefully over a sheet of paper the moss you have scraped off the tree you will be likely to find some small pupæ or hibernating larvæ; more frequently the latter are discovered in moss growing on the ground, especially among underwood. You may vary your employment and rest your back by looking on poplars, willows and alders, for the hard cocoons of the *Ceruræ*, hard to see as well as to feel, but delightful to find: these you must cut out with a piece of the bark attached all round, taking care of course to cut deep enough to avoid injuring the pupæ. If you study Micro-Lepidoptera a search among the fallen leaves will give

you hosts of pupæ laid up snugly in their mines: *Lithocolletis irradiaella* was first reared in this way. Gather stems of *Umbellifera*, thistles, teasles and herbaceous plants of all kinds, and as many seed-heads of all sorts as you can; keep them out of doors till April, then take them into a room, and all summer long you will have arrivals of silent though active visitors.

If you are a Coleopterist your digger will find profitable employment in ripping the loose bark off felled timber, turning up beetles in the larva, pupa and perfect state. Those who live near old trees should now be happy; their decayed wood is a perfect mine of wealth to a Coleopterist. Puff-balls, now ripe, yield, besides their dust, *Lycoperdina Bovistæ* and *Cryptophagus Lycoperdi*: one wonders how they can live in such a smother. *Fungi* and *Boleti* generally are now worth searching. But the beetle-hunter now revels in the joys of searching for the 'moss-troopers.' Let moss grow where it will it always affords winter quarters to millions of beetles. Shake well a handful over a large sheet of paper and see how they come tumbling out: some set off and run for their lives; stop them, if you want them, and put them into your laurel-bottle. Throw away

the moss, and place the shakings into a bag or canister for examination at home after the sleepers therein have been awakened by the warmth of your room. Repeat the operation as long as you like, and then you will find that you have abundant employment for those days when you cannot make active demonstrations out of doors.

Hymenoptera, *Hemiptera* and *Diptera*, often make their appearance among moss. If you want these now is your time; if not, perhaps some friend would thank you for them; if neither, think before you throw them away whether you ought not to want them, to learn something about them.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in

Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER Row, as well as of the Publisher.

Several communications only wait for room.

G. SMITH.—Your note of 20th October, inserted in No. 4, was held back because it seemed that the two pairs of *Phlogophora empyrea* therein mentioned were also referred to in your note of the 27th, inserted in No. 3; but we afterwards saw that the note of the 20th says "two pairs," while that of the 27th says "three," and so we inserted it. There is a further discrepancy. Mr. Hemmings in his note of the 30th (p. 31) says you captured "three" on the 15th: these are not mentioned by you, unless the date of the "15th" is an error for the "14th." Can you clear up these differences?

DUPLICATES AND DESIDERATA.

Lepidoptera.—Will you please to insert in an early Number the following list of insects I have to spare, and what I want?

Thecla Rubi,
Polyommatus Alsus,
Lithosia complanula,
Hepialus velleda,
Diloba cæruleocephala,
Cymatophora diluta,
Acronycta Menyanthedis,
Leucania lithargyria,
 „ *conigera*,

Heliophobus Popularis,
Apamea gemina,
 „ *leucostigma*,
Miana literosa,
Celæna Haworthii,
Agrotis valligera,
 „ *Tritici*,
Xanthia cerago,
Cosmia diffinis,
Dianthecia Cucubali,
Polia flavicincta,
Epunda Æthiops,
Hadena rectilinea,
Cloantha Solidaginis,
Xylina rhizolitha,
 „ *petrificata*,
Mecyna Asinalis,
Coremia erutaria,
 „ *olivaria*,
Phibalapteryx lignaria,
Melanippe tristaria,
Cabera exanthemaria,
Eupithecia rufifasciaria,
 „ *Linaria*,
 „ *subfulvaria*,
 „ *palustraria*,
Strenia clathraria,
Eudorea pallida,
Sericoris micana.

Wanted.

Notodonta dictæa,
 „ *dictæoides*,
Cymatophora ridens,
Eurymene dolobraria,
Speranza conspiciuaria,
Anticlea sinuaria,
Eucosmia andularia,
Zerene adustaria,
Abraxas pantaria,
Bapta taminaria,
Ephyra trilinearia,
Aleucis pictaria,
Dosithea ornataria,
Bradyepetes amataria.

—THOMAS H. LANGCAKE, *Beeston Hill, near Leeds*; November 17, 1856.

CAPTURES.

Cerambyx Heros? at Chatham.
—About the end of July or beginning of August was given to me alive a large black male *Cerambyx* (*C. Heros?*), which had been captured in this dockyard. The body of this beetle is nearly 2 inches long, and each of its antennæ is $3\frac{1}{4}$ inches long. This is the fifth specimen of this beetle I have seen; three of them being in my collection, a male and female having been captured in 1853; one, a male, in the collection of a friend; and one which I saw in the hands of a fellow-apprentice about twelve years ago, the whole of which were captured in this dockyard. Can any of your readers inform me whether the capture of this beetle has been recorded before in England, and if so, where; also of what country it is a native?—W. CHANEY, 20, Upper Britton Street, New Brompton, near Chatham, Kent; November 9, 1856.

Heliophobus hispida.—I beg to inform you that I have a specimen of *Heliophobus hispida* captured on the 9th of September last by my little sister. I placed it in my collection as *H. Popularis* until I saw the description in the 'Manual.'—CHARLES ROGERS, 11, St. Andrew's Street, Plymouth; November 14, 1856.

COMMUNICATIONS.

Hybernating Larvæ and Pupæ.
—In pages 41 and 42 of 'The Substitute' a question is asked

upon the above subject. I simply say that the three species of *Lasio-campa* there mentioned are all common here; and according to my observations *Rubi* and *Quercus* live through the winter in the larva state, *Rubi* being full grown before it hibernates for the winter. *Quercus* cannot be said to hibernate, as I find it throughout the winter on sunny days feeding, but, unlike *Rubi*, they are still small, and do not increase much in size until the spring is far advanced. I certainly never saw or had a larva of *L. Quercus* that made its cocoon in the autumn as your correspondent states. *Trifolii*, in economy, is distinct from the two others of the genus in this particular, viz., the eggs of this species do not hatch until March, so that it is in the egg state six months; thus in March the larva leaves the egg, and the imago appears at the latter end of August; so that the whole of the metamorphoses is completed in six months. The information where to find them is as follows:—*Rubi* larvæ may be found on heaths and commons, and particularly downs, throughout the winter, hibernated under the earth about furze bushes. *Quercus* I find on warm days in spring and winter in hedges. *Trifolii* being in the egg state throughout the winter, and, moreover, very local, no benefit can arise to any one to know what situations they are in, as practically it would not answer to hunt after eggs that are deposited singly and without any adhesive matter among grass on cliffs and slopes; but if any one would like to see the eggs of this species I have now a good number, and

shall be pleased to forward them to any one who may apply for them. In one of the Numbers of the 'Intelligencer' or 'Zoologist' (I cannot recollect which), a person showed his disbelief in the fact of *Lithosia* larvæ eating grass or other plants than lichens. I will just observe that *Lithosia complana* was taken among grass, that it ate grass, and I fed it upon grass for many weeks. They were very young when taken, and about this time two years ago I had them eat the leaves of forest trees also, and I have had them refuse any thing and every thing I offered them.—J. J. READING, *Plymouth*; November 20, 1856.

Specimens of Zygaenidæ requested.—If any of your correspondents would favour me with any specimens of the *Zygaenidæ* I should be very much obliged.—F. B. W. WHITE, 2, *Athole Place*, *Perth*; November, 19, 1856.

"*Who bids for the Bugs?*"—Since the spirited appeal on behalf of this order of insects, which appeared in No. 24 of the 'Intelligencer,' I have been anxiously awaiting the announcement that some one was going to make a bid for them. It would doubtless be a great gratification to many to hear that a volume on this order was in preparation; such as Walker on the Diptera, Stainton on the Tineina, Smith on the Bees. Why is so much attention devoted to the Lepidoptera exclusively? Mainly, I imagine, because through the numerous works on them that have been published and are still publishing, the collector is able, by his own study, or with the assistance of others, to make something of them. He can

talk about them, write about them intelligibly, arrange them, know what he has and what he wants, where and when to look for them. Even in Lepidoptera almost every one that collects them now collects the Tineina; but it was not so in England before Mr. Stainton set to work at them, correcting the nomenclature, studying their habits, and communicating all the information that he could gather. They were neglected by a great many, simply because they could make nothing of them. And so it is with the Hemiptera: without accessible books containing specific descriptions, without ready access to correctly-named collections of good specimens, the student in any branch of Natural History makes excessively slow progress. During an excursion to the New Forest in September, I collected such of the Hemiptera as came in my way whilst looking for other orders, but of those which I brought home I could make out the specific name of only two; one is the *Corizus Hyoscyami*, and I beg leave to ask a question about it. What has it to do with the *Hyoscyamus*? Do, I pray of those who can supply it, let us have some information about the bugs, or any of them, one species only excepted.—BENJ. COOKE, 49, *Ardwick Place*, *Manchester*; November 22, 1856.

Answers to Queries in 'The Substitute.'—In reply to Mr. Lubbock's enquiry I have some hundreds of a case-bearer now feeding, bred from a case which never had a male near it: they are feeding upon lichen. [What is the name of the case-bearer?] In reply to Mr. Barrett's enquiry,

here we find the cocoon of *Eriogaster lanestris* on thorns and rose-stems around old pits. The larva of *Lasiocampa Quercus* should be now about an inch long, and may be found dormant amongst dead leaves. *L. Trifolii* is still in the egg: these hatch in February and March. *L. Rubi* is hybernating, curled up in a cavity in the earth, or in dead leaves. *G. Ilcifolia* is now in pupa, in a white silken cocoon.—C. S. GREGSON.

I have on several occasions seen larvæ which had issued from a case of *Fumea nitidella*, in which, as is well known, the female deposits her eggs. There is every reason to believe that these eggs were unimpregnated, because I found the cases directly after they were spun up, and long before the imago appeared. I am tolerably sure that I have had larvæ from cases which the larvæ were carrying about when I found them at Black Park, and to which cases no male imago had access; but I cannot find the memorandum I made at the time, and so will not be positive.—J. W. DOUGLAS, *Lee*; November 22, 1856.

Sirex gigas.—On the 23rd of August, 1855, I took, for the first time, *Sirex gigas*: it was in company with a number of wasps, and apparently eating a pear when I first molested it; it flew rapidly away to another part of the garden I was in. When captured it used its ovipositor like the Ichneumonidæ.—JOHN D. HEAD, *Sidcot School, near Weston-super-Mare, Somerset*; November 10, 1856.

Announcement of Duplicates.—In No. 1 of your valuable periodical you gave us a very capital

article on the exchange of duplicates; but I am sorry to say that part of it which related to the "*quid pro quo*" system has been entirely overlooked by most of your numerous readers, for I have myself written an immense number of epistles begging specimens, and yet I have not in any one single instance received an answer to those letters which did not contain an offer to exchange; and having exhausted my stock I am now unable to obtain any desiderata. Now, Mr. Editor, this state of things will never do; it is a disgrace to the entomologists of Great Britain, and will, no doubt, do more to deter young hands from following this delightful study than any thing else. Surely those persons who do not intend to GIVE AWAY their specimens should say so, and not take to themselves the public credit of being magnanimous without the private cost; and my object in asking you to let this letter appear is to beg that all entomologists will, in future, state whether they intend or not to part with specimens without a return, in order that we poor novices may not waste our postage-stamps to no purpose. I could say a great deal more on this subject, but, fearing to encroach too much on your space, I shall conclude by subscribing myself—ONE OF THE SUFFERERS.

Attracting Male Moths.—I have succeeded in obtaining male moths by placing on the body of a tree, in the evening, females that have been unfortunate enough to emerge into the imago state with wings crumpled and unfit for use. I should recommend all those who

are not acquainted with this fact to try the plan, as there is almost a certainty of getting a stock of eggs as well as the male moth. — R. H. FREMLIN, *Wateringbury*; *November 18, 1856.*

[What are the species you have tried?]

Ægeria Bembeciformis. — I should feel exceedingly obliged if any of your readers will favour me with its history. I do not understand it, although I take the insect every summer in abundance. It appears in July on the trunks of the black poplar, *Populus nigra*. The larvæ seem to feed for two or three years, for I can find them of various sizes at the same time that the moth makes its appearance. I have counted above sixty empty pupæ projecting out of one tree, and I have no chance of locating the species on a tree that is not infested with it, for all the trees in this locality are infested with it, more or less. — JOSEPH CHAPPELL, 2, *Parlington Street, Tontine Street, Salford*; *November 19, 1856.*

Odontaus mobilicornis. — In the answers to correspondents in No. 3, it is stated that this beetle is not given by Stephens as British, which is correct, but it might have been added that it is the same insect as *Bolbocerus mobilicornis* of Stephens' 'Manual.' In the 'Proceedings of the Entomological Society for 1854' is a translation of an interesting account in the French 'Annales' of a successful method of capturing this beetle, from which I make the following extract. — "I station myself upon a road which is rather lower than the field (of lucern), and thus by stooping a little I

have my western horizon just above the stems of the lucern: this circumstance is indispensable for success, for it is between eight and nine o'clock (in June and July) that I find the insect flying heavily over the lucern, and if it be not projected upon the sky it is impossible to see it on account of the obscurity. To ensure a successful result it is necessary to have a sky without clouds and an atmosphere very hot and calm, without which the insect does not fly. When the weather is favourable I take in half an hour four or five specimens, but more males than females." Does "Carabus" capture this insect? — J. W. DOUGLAS, *Lee, Kent*; *November 22, 1856.*

Cerura vinula. — This year I obtained several larvæ of *Cerura vinula* at Battersea. Not having seen any before I was anxious to rear them, and accordingly placed these in my box with the leaves of the trees I found them upon. The next day I found that not one of the leaves had been touched, and in a week's time they were all dead, having starved themselves. Will you be kind enough to insert this in 'The Substitute?' perhaps some of your correspondents can oblige me with the reason of it. — EDWARD R. PRIEST, 14, *Parliament Street.*

An Entomological Ramble in the Isle of Wight.

[Continued from p. 45.]

We are soon roused, however, from our recumbent position in the clover by the angry buzz of two or three bees (whom we have somewhat incommoded by sitting upon), and we hasten to escape

before the enraged insects have recourse to more effective weapons than buzzes. We walk on by the side of the hedge watching (like Mr. Micawber) for something to "turn up." How hot it is! We feel quite incompetent for the exertion of beating, so we stroll lazily along till we reach a small clearing where some clover has been cut down. Directly we reach the spot our eye rests upon an insect settled with expanded wings on a fallen clover-stalk, whose size, form, and beautiful harmony of colour, proclaim it to be *Cynthia Cardui*. We know how active and easily-alarmed this species is, so we approach it with great caution, holding our net with the mouth downwards, so as to drop it over the insect when a fitting opportunity occurs. A few seconds elapse and *Cardui* closes his wings. Now or never! Down goes the net with a sudden swoop! Not sudden enough to entrap *Cardui* though. Quick as thought he glances from his seat at the very instant the net is falling, and in another moment is half across the field, where, strange to say, it is very difficult to follow his flight, for, although so large and conspicuous an insect when at rest, yet, when flying, he seems to lose all his colour and to dwindle to half his size.

[This singular circumstance, I suppose, is caused by the colours being all of a somewhat subdued tint, and being very equally dispersed over the whole surface of the wings, so that in the rapid motion of the wings in flight the colours are so blended together that they lose their distinctness. Of course, I only give this as a sup-

position, but I have so repeatedly noticed this fact in the flight of *Cardui*, that I cannot refrain from calling attention to it here.]

We determine, however, to await his return; and sure enough he soon reappears; and after rushing over the hedge and back again two or three times, actually settles boldly on a clover-head close to us, and, as if tired with his exertions, closes his wings and begins to extract the honey. It's his last meal, poor fellow! Sweep goes the net!—a flutter—a squeeze, and all is over with him. Calmly we walk on (at least with as much composure as we can muster under the attacks of those horrid *Diptera*!) We behold *Vanessa Io* and *Urtica* sitting in dozens on the clover flowers; but these species being lucky exceptions to our wants, we pass on without molesting them. *Plusia Gamma*, too, bustles about in the clover in the most consequential manner; indeed, he makes the most of his "little day," for, visit him when you will, by night or day, you will almost always find him feeding on the honey of clover or other flowers. We now reach the gate at the end of the clover-field, surmounting which, we enter a large ploughed field, bounded on the side farthest from the sea by a small hanging copse which covers a steep sandy cliff rising abruptly from the field. We immediately make for the edge of this copse, and, when arrived within a few yards of it, we become aware of the presence of *Hipparchia Hyperanthus*. We look higher up the cliff, and see that the bramble flowers are surrounded by numbers of them, so we accordingly set to

work, and, with a little trouble (owing to the nature of the ground), soon capture about a dozen. While engaged in this pleasing occupation, we observe a sudden flash of bright golden yellow float down from above like a living sun-beam, and rest abruptly on a flower close to us; one glance, and we recognize *Paphia*. For a moment we experience the feeling so truly remarked by Mr. Stainton as unnerving one for action; but we conquer it almost directly, and with one well-directed blow the beautiful creature is captured. It, too, is transferred from the net to our nearly-filled box; and somewhat tired we retire to the clover, and sit down to rest ourselves.—ROLAND TRIMEN, 71, *Guildford Street, Russell Square*.

[To be continued.]

NEW BOOKS.

GLAUCUS; OR, THE WONDERS OF THE SHORE. By CHARLES KINGSLEY, F.L.S., Author of 'Westward Ho!' 'Hypatia,' &c. Third Edition, corrected and enlarged; cloth, gilt edges; price 3s. 6d. Cambridge: Macmillan & Co.

"The sixth thousand" of 'Glaucus' is now advertised. Hence of the two previous editions five thousand are in circulation, with all their blunders about the Entomology of this country being exhausted. Those who possess those editions are requested to observe

that that assertion is *untrue*. Knowing this to be the case, and knowing that a confident erroneous statement must do injury, we wrote to Mr. Kingsley and pointed out his error. This is not a solitary instance of our going out of our way to point out to other people blunders they had committed: sometimes we get into scrapes thereby; but, never mind, we do our duty.

On this occasion "virtue had its own reward," for our imprudence in pointing out the error to a perfect stranger was not only taken kindly, but has led to a continued correspondence, a promise to correct the error in the next edition, and further it has led but we had better not run away any further from our subject.

Instead of now reading that "Entomologists are spending their time in verifying a few obscure species," &c., we find that for "the entomologist much remains to be done;" but then, Mr. Kingsley perversely adds, "only at a heavy outlay of time, labour and study."

This is not true. We don't wish to be thought too *exigeant*, but certainly we are not content yet with page 23 of this third edition.

The entomological additions to the volume will be found at pages 154—160, and at 166—168: we would willingly extract the larger portion, but our space is unfortunately, like so many of the new Companies of the present day, "limited," so we content ourselves with the following brief quotation about the insect inhabitants of our streams.

"But perhaps the most interesting of all the tribes of Naiads are

the little 'water-cricket,' which may be found running under the pebbles, or burrowing in little galleries in the banks; and those 'caddises' which crawl on the bottom in the stiller water, enclosed, all save the head and legs, in a tube of sand or pebbles, shells or sticks, green or dead weeds, often arranged with quaint symmetry, or of very graceful shape. Their aspect in this state may be somewhat uninviting, but they compensate for their youthful ugliness by the strangeness of their transformations, and often by the delicate beauty of the perfect insects, as the 'caddises,' rising to the surface, become flying *Phryganeæ* (caperers and sand-flies), generally of various shades of fawn-colour; and the water-cricket (though an unscientific eye may be able to discern but little difference in them in the 'larva,' or imperfect state) change into flies of the most various shapes, —one perhaps into the great sluggish olive 'Stone-fly' (*Perla bicaudata*); another into the delicate lemon-coloured 'Yellow Sally' (*Chrysoperla viridis*); another into the dark chocolate 'Alder' (*Sialis lutarea*); and the majority into duns and drakes (*Ephemera*); whose grace of form and delicacy of colour give them a right to rank among the most exquisite of God's creations, from the tiny 'Spinner' (*Baëtes*) of iridescent glass, with gorgeous rainbow-coloured eyes, to the great 'Green Drake' (*Ephemera vulgata*), known to all fishermen as the prince of trout-flies."

This and the passage that follows are aimed at inciting anglers to entomologize. Mr. Kingsley, himself an angler, holds that race in higher respect than we do.

EXTRACTS.

NOTES ON NOCTUÆ: FROM
GUENEE'S NOCTUELITES.

[Continued from p. 58.]

Heliophobus.

The larvæ of this fine genus live in the style of those of *Xylophasia*, but they are easily distinguished from them as well as from those of *Agrotis*. This genus is very natural, were it confined to the single *Popularis*; but when we attempt to introduce other species it becomes very heterogeneous. Not wishing to split up the genus *ad infinitum*, I have divided it into groups. The first group contains the type of the genus; its larva is perfectly known, and has many points of relation with those of certain *Luperinæ*, and, like them, feeds at the roots of grasses; it is particularly shining, thick, and is attenuated at the ends, and coils itself up immediately that it is disturbed. The perfect insect at first glance resembles a *Neuria*, which was long placed in the same genus; but it is the whitish nervures sharply expressed on a brown ground-colour which occasion this resemblance, which is only apparent. The female in the size of the abdomen surpasses all known European species. The male flies with vivacity at dusk, and one may easily procure considerable numbers by placing a light near a window looking into the country, at the close of summer.

The second group affords us a curious anomaly. The female, until recently unknown, has been

lately discovered by M. Dardouin, of Marseilles: it has the wings reduced to very short stumps, as in *Hybernia*; the thorax is much contracted, and the pterigodes and collar are only rudimentary; the palpi are much shorter than in the male, and the legs, almost smooth, have the claws hardly perceptible; the abdomen alone is well developed. (Vol. I., pp. 168, 169.)

[To be continued.]

NORTHERN ENTOMOLOGICAL SOCIETY.

October 4th, 1856. B. Cooke, Esq., President, in the Chair.

Election of Members.

Reverend H. H. Higgins and J. H. Langcake, Esq., were elected Members.

Honorary Members.

F. Bond, J. B. Hodgkinson, E. Brown, and J. Tinker, Esqrs., were elected Honorary Members.

Exhibitions.

Mr. Buxton exhibited a fine box of Tortrices and Tineæ; amongst them was a fine series of *Ænectra Pilleriana*; and also a box containing long series of *Agrotis Saucia*, *Agrotis Lunigera*, and *Hadena Lutulenta*.

The President exhibited a new "Fly," taken by J. Cooper in Perthshire, and read a description of it under the name *Æstrus biangulatus*, Cooke.

Mr. N. Cooke exhibited a box in which was his new *Noctua Grammophora diptheroides*, Cooke; also an extensive series of *Tinea Merdella*, Zel., *Tinea nigrifoldella*,

Greg., and a specimen of *Phycita semirufa*, Haw.,—this had been returned from London as a new species.

Mr. Cooke exhibited, on behalf of Mr. Burchall, specimens of *Dosithea immutaria*, &c., taken in Ireland.

Mr. Greening exhibited a splendid series of *Eupithecia succenturiaria*, varying from the typical form of that species through the whole of the names *subfulvata*, *cognata*, *oxydata*, &c., which different authors have given to this hitherto little-understood species; some bred *Lamprosetia Verhuell-ella* and the pupa cases, and a quantity of Ichneumons bred during the summer; also a fine series of *Eupithecia denotata* and *constrictata* taken in Wales.

Mr. Gorlick exhibited *Chrysoclista Schrankella*, taken near Manchester, and a new species of *Elachista* allied to *Kilmunella*.

Mr. Hague exhibited a box, in which there were *Eupithecia succenturiaria* and varieties, *Eupithecia denotaria*, *Dosithea eburnata* and *Acidalia degeneraria*, all taken near Conway.

Mr. Gregson exhibited the following insects, taken by Mr. Langcake near Conway:—*Emmelesia bifasciaria*, *Eupithecia expallidata* and *Eupithecia succenturiaria*, var. *cognata*.

The President then exhibited *Peronea potentillana*, Cooke, n.s., which feeds upon strawberry, and is allied to *comparana*, but distinct. He handed a box round, in which were *Peronea Shepherdana* and *Crambus Ericellus*, taken this season.

Mr. Gregson exhibited bred *Tinea nigrifoldella* (brought for

distribution amongst the members) and the original specimen of *Tinea pallescentella*, Sta., which he believes to be the same species as *Tinea merdella* of Zeller: he then showed his series of *Eupithecia succenturiaria* and its varieties; these and Mr. Greening's magnificent series removed all doubts as to the various forms before the meeting being one species: he then read a paper on the genus *Anthrocera*.

A vote of thanks being passed to the various friends and members who had contributed to the pleasure of the meeting, the remainder of the night was spent in examining the very great number of insects of all orders brought and sent for exhibition.—C. S. G.

TRANSACTIONS OF THE ENTOMOLOGICAL SOCIETY OF LONDON.

In these have lately appeared two papers by Mr. Stainton, viz.: "*On the Spirit in which Scientific Books should be Read and Studied*," and "*How may the Onward Progress of the Study of Entomology be best furthered?*"

Mr. Stainton will be happy to forward a copy of either of these papers to any one enclosing two postage-stamps, or a copy of both for three postage-stamps.

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To collect the Larvæ of Micro-Lepidoptera.

Table of appearance of British Tineina.

Calendar of British Tineina appearing in the Imago state.

On the Habits of Tineina Larvæ.

Calendar of British Tineina appearing in the Larva or Pupa state.

How to rear Micro-Lepidoptera from the Larvæ.

How to kill Micro-Lepidoptera.

How to set Micro-Lepidoptera.

Entomological Localities.

Ten Days at Kilmun, with a Trip to the Isle of Arran.

On the necessity of the Collector keeping a Journal.

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John Van Voorst, 1, Paternoster Row.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 8.] SATURDAY, DECEMBER 13, 1856. [PRICE 2d.

POPULAR ENTOMOLOGY.

At a meeting of the Manchester Mechanics' Institution, on the 18th November, Lord Palmerston, in the course of an address full of practical wisdom, made the following observations, and we think they are so good in themselves, and so applicable to our purpose—the diffusion of entomological information among the people—that we have resolved to bring them before our readers. “The first object of instruction ought to be that which we have been told is the meaning of education—to teach a man how to live—and to teach a man how to live, his attention ought first to be directed to that pursuit to which he means to devote himself through life: there indeed he should drink deeply, and there he should endeavour to perfect his knowledge; but should he on that account not endeavour to enlarge his mind, to extend his views, and obtain information on other matters not connected with the business of his profession? Then we may be

told that we will make him a mere smatterer in knowledge, to which I reply that it is better for a man to be a mere smatterer than to be ignorant and uninstructed. An ignorant man believes that his country is the only one in the world, that this planet is the only great portion of the Creation, that the sun is placed in the firmament merely to warm him, the moon to light him home, and the stars to amuse him on the journey; but when he is let into the secret of that vast universe, the contemplation of which fills the mind with awe, his views become more liberal and enlightened, his mind is raised above the grovelling ideas of life, and he finds himself a superior being to what he had been before.” Emphatically true are these sentiments; and we wish we could engrave them on the hearts of the great artizan class whose heads and hands have made this England what it is. Emphatically true of all knowledge, whether of worlds rolling in their orbits, or of insects basking in the sunbeam or floating in the evening's shade. The study of the

laws of Nature, as seen in one or other of the developments of typical forms, is open to all men, and in every development equally efficacious in its results upon the individual, the benefit being in proportion to the time and attention bestowed. Well is it that it is so; all tastes are not alike, and no man has the time to work up any of the great kingdoms of organic or inorganic matter. Every one must make his selection; and we would especially call attention to the insect race, as a world of wonders accessible to all, requiring no expensive apparatus, and no vast outlay in books, and on these accounts especially available for working men. Would that we could win some of the intellect daily exhibited by this class in their business, to the study of insect life in their leisure hours! Sure we are that even were the individuals never to become scientific entomologists, although they were eventually only "mere smatterers," they would be happier and better men. We are sure of this because we know that all men must and will have recreation, and that a change of employment, such as the study of insect life affords, would give them that recreation without the debasing consequences attending the means usually used to obtain it. Not that we would extol Entomology

as the renovator of the human race: no, we take it in conjunction with other science, art and literature, as a means for developing the faculties of men, showing what position and proportion insects bear in and to the whole creation, and thus help to extend mens perception of the scheme of Nature in which both insects and men play perhaps an equally important part. And it may be that an acquaintance with the wonders in insect life which human intelligence cannot comprehend, may suggest to these students how reasonable it is to believe that they themselves are problems that must wait for their solution until they attain a further development in another stage of existence.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to

Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & Co., PATERNOSTER Row, as well as of the Publisher.

Several communications only wait for room.

G. LEWIS.—Mr. Stainton is at home to any Lepidopterist, at 6 P.M., on the *first Wednesday* in every month.

E. HORTON.—Agreed. We will be more guarded in future. We do not pledge ourselves to accept the paper on the Sunday question, but we are open to read one.

ERRATUM.—Page 69, second column, line 27, for "*Atalanta*" read "*Urticæ*."

DUPLICATES AND DESIDERATA.

Lepidoptera for Exchange.—I have abandoned all idea of making any future collecting excursions to Scotland, but perhaps the following list of my duplicates will prove interesting to many entomologists, and tend to stimulate collectors to future exertions in that part of the kingdom, seeing that all were captured in Perthshire, except *Psyche nigricans*, and a few other species whose locality is well known.

Erebia blandina,
 „ *Cassiope*,
Lithosia muscerda,
Nudaria senex,

Phragmatobia fuliginosa,
Orgyia fascelina,
Lasiocampa Callunæ,
 (Palmer.) Zool. p. 1656,
Ptilophora plumigera,
Clostera reclusa,
Psyche nigricans,
 „ *opacella*,
 (Steph.) Mus. Cat. p. 310,
Fumea nitidella,
Acronycta Myricæ,
 (Guenée) Zool. p. 1439,
Diptera Orion,
Stilbia anomala,
Leucania pudorina,
 „ *littoralis*,
Nonagria neurica,
 „ *Cannæ*,
Luperina albicolon,
Crymodes Templi,
Xylophasia sublustris,
Noctua Dahlii,
 „ *depuncta*,
Chersotis Haworthi,
Spælotis cataleuca,
Agrotis cursoria,
 „ *valligera*,
Heliophobus popularis,
Orthosia neglecta,
Xanthia ferruginea,
Dianthæcia conspersa,
Eremobia ochroleuca,
Polia Chi,
Hadena Æthiops,
 „ *adusta*,
 „ *rectilinea*,
 „ *Atriplicis*,
 „ *glaucia*,
Aplecta tincta,
 „ *occulta*,
Xylina rhizolitha,
 „ *petrificata*,
 „ *semibrunnea*,
Calocampa vetusta,
 „ *exoleta*,
Cucullia Lychnitis,
Aporophila australis,
Cloantha Solidaginis,

- Xylocampa lithorhiza*,
Anarta melanopa,
 „ *cordigera*,
Plusia interrogationis,
 „ *bractea*,
Psodos trepidaria,
Speranza brunneata,
Eupisteria carbonaria,
Cleora cinctaria,
Alcis subcærulearia,
Boarmia Laricaria,
Charissa obfuscata,
Gnophos pullata? (Wales)
Celma imbutata,
Coremia Salicata,
Electra Chenopodiata,
 „ *populata*,
Harpalyce Galiata,
 „ *albocrenata*, (Cur.)
Aplocera cæsiata,
 „ *flavicinctata*,
 „ *ruberata*,
Thera Juniperata,
 „ *variata*,
 „ *simulata*,
 „ *firmaria*,
Oporabia neglectata, (Steph.)
 „ *autumnaria*,
 „ *filigrammaria*,
Lobophora polycommata,
 „ *lobulata*,
Eupithecia rufifasciata,
 „ *Callunaria*,
 „ *castigata*,
 „ *austerata*,
 „ *sobrinata*,
 „ *abbreviata*,
 „ *subfasciata*,
 „ *indigata*,
Eucestia Spartiata,
Phibalapteryx lignata,
 „ *polygrammata*,
Plemyria lapidata,
Emmelesia blandiata,
 „ *ericetata*,
Ptychopoda immutaria,
 Ent. Ann. p. 31
Dosithea eburnaria, (Wocke)
- Acidalia holosericearia*,
 „ *fumata*,
Asthena candidata,
Hypena crassalis,
Aglossa cuprealis,
Pionea stramentalis,
Scopula alpinalis,
Pyrausta ostrinalis,
Lozotania dumetana,
Amphisa prodromana,
Peronea hastiana, (in great variety)
 „ *rufana*, (in great variety)
 „ *lipsiana*,
Cræsia Bergmanniana,
Spilonota roborana,
 „ *rosæcolana*,
 „ *amænana*,
Lithographia nisella,
 „ *cinerana*,
Anchylopera uncana,
 „ *unguicella*,
Pæcilochema piceana,
Coccyx strobilella,
 „ *ustomaculana*,
 „ *Vacciniana*,
Pamplusia monticolana,
Ephippiphora coniferana,
 „ *fissana*, (Steph.)
Cnephasia Stephensiana,
 „ *octomaculana*,
Ablabia pratana,
Euchromia fulvipunctana,
Orthotania striana,
Sericoris urticana, (variety?)
 „ *alternana*,
 „ *cespitana*,
Eupœcilia ruficiliana,
Crambus dumetellus,
 „ *pascuellus*,
 „ *silvellus*,
 „ *falsellus*,
 „ *margaritellus*,
 „ *contaminellus*,
 „ *Warringtonellus*,
Eudorea atomalis, (Doubl.)
 „ *murana*,

Eudorea lineola,
Pempelia dilutella,
 „ *palumbella*,
Tinea fulvimetrella,
 „ *picarella*,
 „ *ochraceella*,
 „ *rusticella*,
Nemophora Schwarziella,
 „ *pilella*,
Prays Curtisellus,
 „ variety? (*rustica*)
Plutella Dalella,
Depressaria ciniflonella,
 „ *costosa*,
Gelechia galbanella,
 „ *sequax*,
Acrolepia granitella,
Lithocolletis Vacciniella,
 „ *Messaniella*,
Nepticula Weaveri,
 (Douglas).

(*Desiderata to follow.*)

—RICHARD WEAVER, 25, *Pershore Street, Birmingham*; November 14, 1856.

Cheimatobia brumaria.—I have many duplicates of *Cheimatobia brumaria*, a species everywhere common I believe; but as the females are not easily found, being apterous, and I having many, they perhaps may be useful to some. You must not send boxes on application for them, but send lists first.—E. S. NORCOMBE, *Heavitree*; November 24, 1856.

Lepidoptera.—I have some spare duplicates of

Polyommatus Corydon,
Biston Betularia,
Orgyia Pudibunda,

if any of your readers are in want of them.—WILLIAM GREGORY, 24, *Clandon Street, near South Street, Waltham*; November 24, 1856.

CAPTURES.

Smerinthus Tiliæ, *Biston hirtarius*, &c.—I have been pupa-digging the last few days in this neighbourhood, and have taken nearly two dozen of *Smerinthus Tiliæ* under elms and lime-trees; also *Biston hirtarius*, and a large number of other species, of which I do not know the names.—R. KING, 30, *Chalcot Villas, Adelaide Road, Haverstock Hill*; November 18, 1856.

Lepidoptera.—On the 19th October I took from off the trunk of a Scotch fir, in Wigmore Wood, a fine specimen of *Xylina Rhizolitha*: on the same evening I captured two good specimens of *Miselia Oxyacanthæ*; and on the next evening two others, in good condition, hovering over the white-thorn, in Hambley Wood. On the 2nd November I obtained two more good specimens of *Xylina Rhizolitha* from off the trunks of Scotch firs, on the border of Hambley Wood. On November 23rd I captured a good female specimen of *Ptilophora Plumigera*, in a lane leading from Luton to the Great Cowbeck Woods.—W. CHANEY, 20, *Upper Britton Street, New Brompton, near Chatham, Kent*; November 23, 1856.

COMMUNICATIONS.

To Preserve Dragon-flies.—The following method of preserving that very beautiful, but much neglected, section of insects—the Dragon-flies—I have found to succeed very well, more particu-

larly with the larger kinds. Having killed the insect with oxalic acid it is *immediately* to be cut open on the under side with a small pair of scissors, and the contents carefully taken out: next take a piece of soft cotton and draw it through the whole length of the body, repeating this with fresh cotton as long as any moisture remains. As most of the colours are inside, care must be taken not to use too much pressure in this part of the operation, or else the manipulator will have the misfortune to find that he has destroyed that which he was endeavouring to preserve. As to the thorax cotton must be repeatedly pressed into it until the moisture is entirely taken up. The abdomen and thorax are then to be half filled with magnesia or French chalk, and the remaining space filled with cotton (lamp cotton answers very well for this purpose); it is then to be slightly tied round to keep it in proper form, and the wings, &c., set with braces in the usual manner, and to be kept in a dry place. By adopting the above plan the various species of *Æschna*, *Libellula*, &c., have almost all kept their colours unchanged; the brilliant yellow of *Cordulegaster annulatus* seems as bright as when the insect was alive.—W. GROVES, 12, Morden Place, Lewisham Road.

Lasiocampa Quercus.—As no one has replied in the last Number of 'The Substitute' to Mr. Barrett's difficulties, on page 40 of a previous Number, would you be so good as to insert the following observations for his benefit. As observed in Argyllshire, *Lasio-*

campa Quercus lives two years, commencing its existence about the first of July in the ovum state. The larvæ emerge from the shells in twenty-four days, and by the end of autumn are fully one inch long. They thus pass their *first* winter in the larva state, resting I believe on the heather. They become full-grown larvæ in August of the next year, and spin their egg-like cocoons, in which they pass their *second* winter as pupæ. The imago appears in the following year from the middle of June to the middle of July. Eggs of *Lasiocampa Quercus* laid on July 6th were hatched on July 30th. If Mr. Barrett had caught his larvæ young enough he would have found that they had no inclination to spin up on the approach of winter. The cocoons of *Lasiocampa Quercus* are generally found on heaths close to the ground, while those of *Saturnia Carpi* are fastened high up on the heather. Our other two species of *Lasiocampa* live only half the time of *L. Quercus*, passing the winter as larvæ. *L. Trifolii* I have not seen in Scotland, though the other two species are abundant in this district. I am not aware that any of the British *Bombycina*, excepting *Cossus ligniperda* and *Lasiocampa Quercus*, enjoy an existence of longer duration than one year. Any information on this subject illustrating the life-history of any long-lived species is very desirable. — T. CHAPMAN, Glasgow; November 24, 1856.

Oiketicus Kirbyi.—A good engraving of this insect will be found in the volume upon 'Foreign Moths,' in the Natu-

ralist's library. It well illustrates the notice by I. I. in one of your Numbers.—ID.

Lasiocampa Quercus.—I beg to state that I bred and reared above fifty specimens of *Lasiocampa Quercus* last year. The eggs were laid August 13, 1855. The larvæ hatched Sept. 5. They fed slightly through the winter, appearing to exist in a state of torpor; changed to pupa (first) June 23, 1856, and to imago August 1, 1856. I send up this note from my Diary in reply to a statement of Mr. Barrett's in No. 4 of 'The Substitute,' to the effect that all the larvæ of *L. Quercus* which he had ever possessed, "spun up in the autumn, and passed the winter as pupæ." I may also mention that some of my pupæ are still undeveloped, and are now passing their winter in cocoon-box.—C. R. LIGHTON, *Ellastone, Ashborne*; November 29, 1856.

Types of the Genera of Coleoptera—a hint to dealers.—I have collected some two or three hundred species of Coleoptera, and now am sadly confused about their nomenclature, having no one to help me, but few books, and little opportunity for getting away from a spot to which parochial duties tie me. Would it not be worth suggesting to some of the London dealers, or needy entomologists, to prepare a few series of typical specimens of genera for sale? I think there would be a great demand for them, and that they would materially tend to increase the number of British Coleopterists, and therefore eventually of British Coleoptera.—H. A. S.

Gastropacha Illicifolia.—I

should feel obliged by your inserting the following in due course. Having friends residing in the neighbourhoods of Dartmoor and Exmoor, where the Whortleberry abounds, I should feel obliged to any entomologist who will forward me a coloured drawing of the caterpillar of *Gastropacha Illicifolia*, as I intend to copy it and to distribute the copies amongst the fruit-gatherers in the above localities, in the hope of alighting upon this species; and if I succeed in procuring any will forward a pair of specimens to the sender thereof. I think if those who reside where the plant abounds were to show a drawing of the larva to the gatherers of the fruit, we should soon have specimens in every collection.—E. S. NORCOMBE, *Heavitree*; November 24, 1856.

The Packing of Specimens to Correspondents.—It is very trying to one after perusing a letter from a correspondent and reading therein the following:—"The insects arrived safe—quite safe—not an antenna injured, for which I am much obliged, and have returned the box containing so and so, which I hope will arrive safe," when at the same time the sender never used the means that they should arrive safely, if they are stuck—large, lumpy, egg-full bodies of *Bombyces* (without a single cross pin to prevent the rumbling thereof if they should get loose)—with *Geometræ* and *Tortrices*, and when you open the cover loose pins and lots of dust are all that remain of specimens you would have given anything to have had perfect. I do not believe in hope, but in action. Take

a little trouble in the packing, and insects must arrive safe at their destination. But there may be many who do not know how to pack them properly: let them pay attention to the following. Be sure to stick the pin on which the insect is firmly into the cork; never stick a small pin into a hole made by a larger one. Cross-pin the abdomens of all moths, both small and large, taking the same precautions as with the insect pin. For *Noctuæ* and *Bombyces* a strip of paper placed over the abdomen and secured with pins at the side is the best plan. If there is but a little of the pin projects under the thorax, hardly sufficient to stick in the cork, don't send it, but keep it yourself, and put another in its place. If the moth is set rather high up on the pin, and there is not depth of cork to take all thereof until the body touches the cork, place a pellet of cotton-wool under it, then strap over the same as above. If a body is loose take it off, wrap it in cotton wool and secure the cotton wool with pins. If these directions are followed you need not *hope* for the safe arrival of the contents of any box; you may be sure of it.—*Id.*

Acherontia Atropos.—Mr. Stainton and other writers assign a very short period for the final transformation of the *Acherontia*. Now this insect being of a very respectable size and tangible, I happen to have made an acquaintance with it, to clear up a puzzle that runs through so many species of moths, as to their continuance and reproduction. I am told in the 'Manual' and elsewhere that the moth appears from August to October, doubtless on good grounds; but how comes it, if this is *all* the truth,

that the female can chance *in autumn* upon a depository for eggs, that may or may not be planted with the insect's food (say potatoes) till the following spring? In September I procured, from near Mountsfield, two fine full-fed larvæ, who retired into the earth, and there they are now. Somewhat later I provided myself with two pupæ, and made them as comfortable as circumstances permitted: they despised, by the way, my arrangements, and persist in lying, like the pigs in the old song, and are *at this moment* visibly strong and active, resisting all attempts to make them lie more decent: the self-buried pair take things more quietly. All this, you see, is at variance with "VIII—X" of the 'Manual;' something more is wanting: and I just throw out a suggestion that you should consider and report upon this at some fitting opportunity. Probably all this is no news to you; but, for the sake of a little variety in "Insect Books," it is worth notice; otherwise it makes us, the uninitiated, imagine that Sterne's complaint, that we make new books as apothecaries make new mixtures, by pouring out of one phial into another, is as much the practice now as in his time. For my own satisfaction I may probably try a generation or two of the Death's Head. — W. R. MORRIS, *Kent Water Works, Mill Lane, Deptford*; November 27, 1856.

Notes by an Old Collector.—Neither to the scientific entomologist nor even "old collectors" do I presume to deliver a statement of my own experience in capturing larvæ; but doubtless there are hundreds of incipients in Entomology, and I wish to draw their attention

to the rearing of larvæ. The pursuit and capture of a moth, its preservation, and the ascertaining of its species, from their peculiar attraction, will always have numerous votaries; but mere moth collectors know not of the *charm* there is in rearing a caterpillar, in noticing its food and manner of eating, day by day observing its changes and its disposition, which is as variable as in the genus *Homo*, and in watching its mode of spinning its web, and its progress towards transition: the rapturous anxiety to distinguish the insect when emerged produces reflection that does not subside with the day. In May and June I have done best along hedgerows: the thorn abounds with *Geometrina* larvæ, most of which require but little feeding; they soon go up and soon come out. In July I prefer the oak-woods. August is a grand month for that glorious larva-feeding tree, the alder; the best *Geometrina* larvæ I ever captured were from alders growing in boggy ground. Wild, uncultivated, barren districts, mosses and the vicinage of a river, are excellent situations for good insects: from almost every tree growing in such localities larvæ may be expected. The end of August, the whole of September, and the first half of October, is the larva-collector's real harvest. For many years during this period was I knee-deep in dew at five o'clock, and from two or three hours after, on each dry morning, beating the trees, shrubs and hedges. Early in the morning is a better time for capturing larvæ than during the day: one instance I will adduce, which will make the reason apparent: I beat a low-growing poplar during the day unsuccessfully;

passing the same tree at an early hour next morning I saw a *Smerinthus Populi* feeding; on taking it off I discovered a *Notodonta ziczac* full-grown. Now where were the two caterpillars the day before? They certainly were not out feeding. The willows growing in hedges are good bushes for larvæ. Going along a lane diverging from the Warwick Road to the river Eden, about three miles from Carlisle, I captured seventeen *Ceruræ* from the willows growing in the lane and adjoining fields, all *furcula*. I have only bred three species of *Cerura*, viz., *vinula*, *furcula*, and what was formerly called *latifascia*. In a field in the neighbourhood of Houghton Moss I came to some low bushes, two or three feet high, of a willow growing near the hedge ditch, and about twenty or thirty yards apart; from these I captured thirteen larvæ of *Clostera reclusa*. On the confines of Scaleby Moss I obtained *C. curtula* off the willow: these are the only species of *Clostera* that have come under my notice. There is one species of willow growing in hedges, which has a dark green, shiny leaf, that I have beat in vain: I could never detect animal life on this bush. There is more intelligence in a caterpillar than many people are aware of. In a former 'Note' I recorded an anecdote of a patriotic caterpillar, *Leiocampa*, of a sturdy old English disposition, preferring death to captivity: I also registered an anecdote of a viciously disposed caterpillar, whose malevolence was equal to anything we have heard of since Cain's time,—the genus of this caterpillar I cannot positively affirm, as I lost the fratricide—the *fact* remains the same.

I will now add an anecdote of a persevering and determined caterpillar, whose steadiness of purpose only ended with its life. On the trunk of a chestnut tree in Dulwich I took a caterpillar of what I supposed was *Apatela Aceris*, and placed it in my breeding-box: on raising the lid, a day or two after, it was spinning its web in the chink between the lid and the box; I broke the web, and the larva dropped to the bottom: the next day, as if to spite me, it was weaving again in the chink, and, as a matter of course, in lifting the lid I again broke the web, and down it fell: notwithstanding these two interruptions, the day following it was in the chink again, pertinaciously pursuing its avocation; the like result occurred from the same cause, this time with a fatal issue, for on looking into my box on the day succeeding I found it dead where it fell, and denuded of hair; this denudation elucidated a subject on which my thoughts had previously meditated, and demonstrated that caterpillars are endowed with reason and not merely instinct. When it first fell from its building, by the props being removed, I observed that it had less hair on than when captured; on the second fall it was perceptible that the hair had further diminished, and at last, when found dead, it was bare. This clearly shows that as it was building its home it was gradually undergoing a process towards transformation, had it not been disturbed in its operation of home erection: when the bed was made it would have been a vital naked caterpillar ready for sleep. I have before informed you of a shallow, unreflecting caterpillar,

Lasiocampa, wayward and wilful withall, but by a little nursing and coaxing it was induced to believe it was spring when only October, and was thus tricked out of some months of its time. We have an example in the *Cossus* of an easy, free-going temperament, adapting itself to circumstances, and as homely and comfortable in his tin case and sawdust as in the heart of his favourite oak.—RICHARD CARTMEL, 13, *Williams Grove, High Park, Walworth*; November 24, 1856.

Cornish Insects.—I should be obliged if you would inform my numerous correspondents in the next 'Substitute,' that I have no duplicates of the insects taken in Cornwall.—REV. E. HORTON, *Wick, Worcester*; Dec. 2, 1856.

EXTRACTS.

KIRBY AND SPENCE'S 'INTRODUCTION TO ENTOMOLOGY.'

"If anything more than a fleeting renown could be acquired by a well-written book on a scientific subject, Kirby and Spence might gain, by their 'Introduction to Entomology,' that sort of immortality which men of letters desire. It is written in a clear expressive style, with a precision which authors less practically acquainted with the subject could not attain, and gives the result of long experience, continued research, and extensive reading, upon many interesting subjects connected with the lives of insects. It takes a minute as well as a general view of the circumstances under which they are produced, and the conditions under which they

live, and contains many interesting illustrations of the presiding influence and care of God over all his works. The comprehensive intelligence with which the subject is treated, the accuracy of the details, and the learned research in which the authors sometimes indulge themselves, will give to this work a long and honourable existence in the literature of science, but, like all other writings of the same class, its days are numbered; and the time will come when it will cease to be regarded as a popular exposition, and the relic of its honour will be frequent quotation by the antiquaries of science.

"This is, we admit, a gloomy view of the authorship of scientific men, and may act as a discouragement to those who write for posthumous fame. But it is certainly true that a man of science cannot reasonably anticipate lasting reputation for a summary of the scientific knowledge of his age, however carefully and ingeniously executed. The renown obtained by the laborious composition of scientific works is, of all others, the most evanescent.

"The cause of this rapid decay in the popularity of scientific books is evident. They are the records of facts, which, by the increase of knowledge, are presented in unanticipated aspects and relations. The discovery of new truths, the correction of old errors, and the more perfect application of established principles, make that defective to-day which was yesterday the representation of existing knowledge. No grace of style, no profundity of thought, can compensate in an elementary treatise for the omission of recent dis-

coveries, or for a narrow and imperfect view of the Science, much less for an erroneous representation of the philosophy of the subject. But, although we cannot peruse the masterly productions of our age without a sigh, conscious of their almost ephemeral reputation, we are, like their authors, cheered by the recollection that the principal object of their publication is always attained, and that when they cease to be longer useful to mankind, it is from the growth of the knowledge which they have imparted, and the higher development of the human intellect. Few books on a neglected subject have been more successful than the 'Introduction to Entomology,' and none have better deserved the reputation obtained. Nor is its mission yet complete. For many years to come it will be read with interest and quoted as an authority; and when its old age is at hand, and it gives place to another favourite, the names of its authors will be remembered with honour, and their labours be recited as a motive for the pursuit of the Science they greatly advanced."—*Eclectic Review*.

On the 20th inst.,

THE ENTOMOLOGIST'S ANNUAL FOR 1857.

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PUPA DIGGING.

THE REV. J. GREENE'S
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John Van Voorst, 1, Paternoster Row.

NEW MUSEUM CATALOGUES. — 1. Lepidoptera Heterocera. By Francis Walker, Esq. Part VIII. Sphingidæ. Price 3s. 6d. post free.

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Zool. p. 4906

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(Schön.) Zool. p. 3718

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Murray Cat. p. 51

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Ent. Annual, 1856, p. 86

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(Payk.) Zool. p. 3718

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(Lin.) Zool. p. 3718

Dircæa discolor, 2s.

Zool. p. 3309

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The price affixed is to each specimen.

* Denotes that the specimens are not quite first-rate.

RICHARD WEAVER,
25, Pershore Street, Birmingham.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 9.] SATURDAY, DECEMBER 20, 1856. [PRICE 2d.

STRUCTURE AND HABIT.

IN the extracts from Guenée's 'Noctuélites,' given at page 32, the following sentence occurs. "The larvæ of the second series, or *Nonagridæ*, have particular manners, which necessitate modifications in their organisation." This may be a slip of the pen—we hope it is—but the idea conveyed is so erroneous that we think it right to offer thereon a few remarks. Modifications from what? What were the *Nonagridæ* before they were modified? and what modified them? Their manners? No: circumstances never modify organisation in this way; and if the habitat be changed a new organisation must be provided. Nature never plays second to circumstance; but the various circumstances occurring in and concerning the existence of her myriads of living creatures all form part of her one great plan, and are foreseen and provided for accordingly; and thus organisation is fitted for the predetermined conditions in which animals have to live.

Among insects climate and situation unquestionably exercise considerable influence upon form, size and colour; but this influence is limited within such bounds that it is very rarely the type of the insects so affected cannot be referred to. Some species have great power of endurance, but it is only within a certain range of circumstances: introduce another element and they perish. Indeed, the idea of species, so to speak, appears to be dependent upon a previous creation of circumstances which required that every kind of organised being should occupy only a limited sphere of action, each sphere, though varying in extent, being apportioned to that one kind which we call "a species." It has been remarked that countries and districts subject to similar climatic conditions, although thousands of miles apart, possess a similar insect Fauna, formed as it were upon the same type. This might be deemed to be a modification of form by circumstance, but we, on the other hand, hold that it is only an introduction of similar forms to similar

circumstances,—the result of the action of those fixed and unalterable powers which we call laws of Nature.

We believe then that habit must depend upon structure, and that we have no proof that structure is ever so far modified by habit as to adapt an insect to conditions totally at variance with the ordinary circumstances of its existence. If it were so, creation would soon become a chaos, and law and order be extinct. Powers may be diminished, not added. Difference of situation is supplied by Nature by difference of species, and not by modification of existing ones; and so, "particular manners" can never "necessitate modifications in their organisation."

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer; and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will

be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER Row, as well as of the Publisher.

Several communications only wait for room.

G. F. M.—The 'Manual' will make two volumes. Vol. I. will conclude with the *Noctuæ*.

The 'Intelligencer' is announced to appear again on the 4th of April next.

DUPLICATES AND DESIDERATA.

R. Weaver's Desiderata: useful specimens. (Steph. Mus. Cat.)

Colias Hyale,
Thecla Betulæ,
 „ *W-Album,*
Polyommatus Arion,
Apatura Iris,
Trochilium Vespiforme,
 „ *Allantiforme,*
 „ *Culiciforme,*
Stauropus Fagi,
Notodonta tritophus,
Lophopteryx cucullina,
Drymonia Dodonea,
Clisiocampa Castrensis,
Eulepia cribrum,
Lithosia aureola,
 „ *helvola,*
Cybosia mesomella,
Triphæna subsequa,
Lytæa agathina,
Charæas cespitis,
Agrotis lunigera,
 „ *obelisca,*

Agrotis cinerea,
Spælotis pyrophila,
Graphiphora ditrapezium,
Dasyampa rubiginea,
Apamea ophiogramma,
Hama sordida,
 furva,
Crymodes Templi,
Heliophobus hispidus,
Polia dysodea,
 flavicincta,
Acronycta Alni,
 strigosa,
 auricoma,
 Salicis,
Ceratopacha fluctuosa,
 ocularis,
Ipimorpha retusa,
Senta flammea,
Nonagria Hellmanni,
 extrema,
Cucullia Gnaphalii,
 Chamomillæ,
Heliothis peltigera,
 scutosa,
Acontia luctuosa,
Emmelia sulphuralis,
Brephos Parthenias,
Odoptera fuscantaria,
 lunaria,
 illustraria,
Euchloris smaragdaria,
Cleora glabraria,
Alcis consortaria,
Cabera rotundaria,
Aleucis pictaria,
Aspilates citraria,
Coremia Ligustrata,
Electra sagittata,
Anticlea Berberata,
 rubidata,
Lobophora sexualisata,
Eupithecia togata,
Shidax sparsaria,
Plemyria gemmata,
Philemene Rhamnata,
Cosmorhoë rusticata,
Emmiltis rubricata,

Acidalia marginepunctata,
 subsericeata,
 degeneraria,
Timandra emutaria,
Macaria alternata,
Colobochyla Salicalis,
Pyralis glaucinalis,
Dolycharthria punctalis,
Botys lancealis,
Sitochroa palealis,
Spilodes sticticalis.

Lozotænia dumetana,
 Branderiana,
Ænectra Pilleriana,
Peronea umbrana,
Spilonota pauperana,
Anchylopera Upupana,
 Mitterbacheriana,
Halonota turbidana,
 populana,
 obscurana,
Coccyx nanana,
Opadia funebrana,
Ephippiphora puncticostana,
 Germanana,
 Trauniana,
Grapholita expallidana,
Cnephasia Penziana,
Eupcecilia Carduana,
 ambiguella,
 notulana.

—
Crambus Cerussellus.

I much approve of the plan of sending a communication before sending any insects and box.—R. WEAVER.

Lepidoptera.—I have duplicates of

Grapta C-Album,
Nemeobius Lucina,
Arge Galathea,
Trochilium Cynipiforme,
Larentia cervinata,

which I shall be happy to exchange for any of the following:

Aporia Cratægi,
 Leucophasia Sinapis,
 Erebia Blandina,
 Polyommatus Egon,
 " Agestis,
 " Callimorpha dominula,
 Arctia villica,
 Euthemonia russula.

— J. JESSOP, JUNR., *Church
 Street, Rawmarsh, near Rother-
 ham.*

CAPTURES.

"*A Rare Old Plant is the Ivy Green.*"—As 'The Substitute' is a "Fireside Companion," by antithesis an account of "doings in the frost" may prove not altogether uninteresting. Dinner and a final glass of port having been discussed, I received sufficient moral courage to say to my brother, "Suppose we take a lantern and visit the ivy which we saw in bloom to-day." This remark was of course caught by the quick ears of the ladies, and elicited divers doubts expressed on their part as to our sanity, including belief in a sufficient stock of that quality in the moths to prevent their exposing themselves to such inclement weather. However, we sallied forth, not without inward qualms and outward wrappers. The ivy reached, a lantern was held to throw a little light on the affair, and my brother cried "I see a moth,—one, two, three." "Where? catch it then." But the wind blew and out went the light, and after it every match struck to renew it. Two "vesuvians" (the initiated will understand) in succession raised a flame, and we began our

search anew. The moths seen at first were *S. satellitia*, of which we took thirty-five; we also took *C. Vaccinii*, *O. lota*, *A. pistacina* and *Xanthia ferruginea*: this was our first night, and was rich in promise. Noisy was our greeting on return, for we affected no success; only after a little of the renowned non-inebriating cup, we requested a loan of some steam from the tea-urn to kill our specimens, the sight of which so turned the tables in our favour that we have been ever since allowed to depart unmolested, save by a casual and harmless grin. The second night I discerned a long crumpled article motionless under an ivy flower. G. pronounced the said article to be *C. exoleta*, and recommended its speedy capture: gingerly did we set about it, for the place was difficult; how to get him into the net was a puzzle, till in despair I proposed knocking him in; the blow was struck, and the moth rolled an inert mass to the depths of his ganzy prison; neither pinching nor pinning disturbed his equanimity, and we naturally supposed him stunned, but finding the event recurrent we concluded that, having taken no pledge, ivy-intoxication was allowed among *Noctue* at Christmas. Henceforth we carried a small baton to tap them gently into the net. On this night, and a few following, we took fifteen *C. exoleta*, eight *X. semibrunnea*, some *X. Lambda*, and, "spes ultima gregis," *D. rubiginea*; once with a rustle and a plunge a downy monster—*Atropos* at least—plumped into my net; pinch him; he squeaks—claws and feathers—by all that's Lepidopterous it is

Troglodytes vulgaris! We took 160 *Satellitæ*, and of course have plenty to spare for anybody who may desire to roast their toes by the fire instead of chilling their fingers on the ivy. Sugaring in the same locality proved an utter failure, and pupa-digging scarcely less so, though the most productive last winter. I may mention, in conclusion, that *Ch. dispar* was taken here last summer, and is in my possession; as also two *S. Convolvuli* taken this autumn, *Edusa*, *Corydon*, *Adonis*, *Alsus*, *Argiolus*, *Agestis*, *Camilla*, *Machaon*, and others which I forget, have also been recent prizes; but as they have not much connexion with frosty evenings I conclude.—W. V. CROTCH, 2, *Albert Buildings*, *Weston-super-Mare*.

COMMUNICATIONS.

On Duplicates and Desiderata.

—In the first number of 'The Substitute' are some remarks by (judging from the style) Mr. Stainton, from which I make the following extract. "Almost every collector has, during the summer, taken specimens of insects which he does not require for his collection, and which he would be glad to give away to any one that wanted them." Every one knows Mr. S.'s own generosity and liberality in this respect, which are indeed deserving of all praise. But I cannot, for my part, subscribe to the opinion that most, or even many, entomologists, exhibit a similar readiness to supply the wants of their brethren: on the contrary, I would say, "Apparent

rari nantes, in gurgite vasto." Mr. S. considers that this spirit *ought* to prevail—that *no* return should be expected—that, in a word, whatever is sent should be sent as a free *gift*. At page 55 of the same work, Mr. Norcombe remarks: "this appears to me perfectly absurd." If, by this, Mr. N. means that it is perfectly absurd to expect that collectors *will* do so, I must confess that I entirely agree with him. But Mr. N. objects to the soundness of this doctrine in theory as well as in practice: "Having all I want for myself of a certain species, why, he asks, should I go many miles for more unless in the expectation of getting others I have not in exchange for them: am I to get boxes, then work hard to get insects to put into them, pay postage, and expect nothing but a 'beggarly array of empty boxes?' " He might have added—the trouble, which is not trifling, of setting them. This appears to me a fair line of argument. The proper spirit, according to Mr. N. is, "to send as many, and as little injured (how I wish some of my correspondents would take the hint!) specimens as you can to your correspondent, expecting he will do the same," &c. *In the main* I concur in this view. Once more, at page 78, we have an indignant letter from "A Sufferer," who, after complaining that his letters requesting the *gift* of certain insects remained unanswered, adds: "Now, Mr. Editor, this state of things will never do; it is a disgrace to the entomologists of Great Britain," &c. This is strong, nay, I think unjustifiable and unwarrantable language.

Surely "Sufferer" does not think that he has a *right* to another man's insects. But he complains that persons who do not intend to "give away," yet take to themselves the public credit of doing so. This is an unpleasant charge. I have carefully looked over the pages of "The Substitute," and, with one exception, I observe no offer of insects unless accompanied with a more or less direct intimation that a return is expected. The one exception alluded to is that of Mr. Norcombe (page 27), who subsequently, as we have seen, stated his views on the subject. When *charges* are made, or *complaints* preferred, the *name* of the complainant should unquestionably be given. I confess the style of "Sufferer's" letter would not be calculated to give a spur to *my* liberality. I will now state my views on this knotty question. *Abstractedly*, perhaps, Mr. Stainton is right; but the honourable and unselfish feelings, which alone could prompt a man to act as he recommends, are not common, and for *practical* purposes we must judge of people, not as they ought to be, but as they are. To my offer of certain uncommon insects, which I am in the habit of taking as pupæ in tolerable plenty, I received many replies. Some of my correspondents having enquired what return I expected, I replied "none,"—my offer being principally addressed to beginners, who probably, if willing, would yet be unable to assist me. This is a "bonâ fide" offer, and, if spared, I shall cheerfully send to as many of my correspondents as I can specimens of the insects named, stipulating

only that the postage be paid. But lest I should appear to claim more credit than I deserve, I freely confess that *generally* when I send good insects I expect, and I think I am *entitled* to expect, a return. In support of this view, in addition to Mr. Norcombe's, I give the following reasons:—I do not *buy* insects—it is far too great an expenditure of time and money for most entomologists to visit in person the various localities where many insects are *exclusively* found, *e. g.*, *Actæon*, *Muscerda*, &c., &c. How then am I to obtain them except by exchange? Again: I receive a box of rubbish, and on opening it find the mites playfully skipping about—such bodies as are left saturated with grease—moths venerable from age, rubbed, scrubbed, tattered and torn. The letter which accompanies this desirable acquisition requests that the box may be returned by next post with bred specimens of *Dodonæa* and *Xerampelina*. Am I not justified in replying that I require a better return for such insects? Every entomologist of two or three years' experience knows that such correspondents are like anything but "angel's visits, few and far between." Much more might be said, but I will content myself, at this time, with remarking, 1st,—That I am always ready to assist (if in my power), without stipulating any return, *bonâ fide* *beginners*, when gentlemen, *i. e.*, gentlemen in their conduct and dealings. 2ndly,—If I send good insects to collectors of my own standing, I *do* expect a return. 3rdly,—If I find a correspondent trying to get the "weather-guage" of me, in self-defence I must make

a bargain, or decline the honour of his correspondence. I wish this latter class numbered fewer followers. As honourable exceptions I mention, of my own knowledge, Mr. Stainton in the "Micro's," and Mr. H. Doubleday in the "Macro's;" the liberality (using that word in its most extended sense) shown to me by the latter gentleman, when I was a beginner, I shall not soon forget. As an illustration of my views I append the names of twelve species, *good* specimens, of which I much want. If any of your readers be able and willing to send all, or any of them, let him say so, adding his own wants. If I can supply them, I will do so; if I can *not*, I will honestly tell him so, and there the matter rests.

S. Bombyliiformis,
E. Cribrum,
C. Castrensis,
Z. Æsculi,
P. Cassinea, females,
N. Dictæoides,
A. Auricoma,
N. Helmanni,
L. Obsoleta,
T. Subsequa,
H. Hispida, and
C. Sponsa.

These twelve are selected from other wants merely, I repeat; as an illustration of what I deem a fair system of that much-abused word—exchange!—REV. JOSEPH GREENE, *Playford, Ipswich*.

Lists of Coleoptera.—Will you be kind enough to tell me, through the columns of 'The Substitute,' where I can purchase a List of British *Coleoptera*, as I am in need of such a list to label the specimens in my cabinet?—FRE-

DERICK FOX, *Coddenham, Needham Market; November 27, 1856.*

[There is no such list to be had, except that of Messrs. Dawson and Clark, which only goes as far as the end of the water-beetles.]

The Cabinet Question.—Seeing in your leader of last week that cheap cabinets are desiderata, some of your readers may be glad to hear how I supplied myself. I have had two made of well-seasoned pine; one has 20 drawers 20 inches by 12 and 2 deep, and the other has 22 drawers 1 foot square, also 2 inches deep; each drawer has a fillet of wood fixed round the inside to rest the glass upon: both cabinets have doors. My maker charges for the first £2 15s.; for the second £2. The cork I buy of John Bussey, cork manufacturer, 106, Blackman Street, Southwark, at 4s. for 24 pieces, each piece about 3 inches by 10, and $\frac{1}{8}$ thick. The glass I use costs me 3d. per foot, and answers the purpose very well. If this communication prove of use to any of your subscribers, I shall feel most happy to give further information.—ROBERT B. WERE, 35, Osborne Terrace, Clapham Road, Kennington; November 1, 1856.

The Cabinet Question.—After reading the article in the 'Substitute,' I spoke to the maker of my cabinet on the subject, and find he will be glad to make cabinets at a low price. I will give a description of mine: it is built of mahogany, French polished, opens with two doors, fastened with lock and key, containing 20 drawers 13 inches by 18 and $1\frac{1}{4}$ deep, made of deal, with mahogany

fronts French polished; they are glazed with good flat glass, and nicely corked and papered. The whole cost was about £8. If any person wishing for a cabinet will send me the order, I shall be happy to forward it, or to answer any questions on the subject.—J. E. HALL, *Hassocks Gate, Hurstpierpoint, Sussex.*

Rounded Setting-corks.—I much admire your leading article of the 29th respecting insect cabinets at a lower price, and I think at the same time there is something you have omitted mentioning, namely, the very high price charged for rounded corks for setting Lepidopterous insects on, for I think there are very few young beginners that can afford to pay from a 1s. to 2s. 6d. for a rounded piece of cork, which is the price asked at the insect dealers for them, and I think if the prices were anything within bounds more persons would take up with Entomology than now do. I have made all my own setting-corks, breeding-cages, and larva boxes, and shall be most happy to show them, and instruct any young entomologist how he can make them at one-third of the price charged at the dealers; likewise my much admired pinning-box.—W. H. LATCHFORD, 1, *Plumbers Place, Clerkenwell; December 2, 1856.*

Write before sending any Boxes.—I have received several boxes containing species which I do not now want, so parties had better write before they send any boxes to me. Several species I have run through, and I do not want to receive any insects without a return on my part. I shall be glad to attend to all as far as my

limited time will allow me, and no one need think anything about not hearing from me for a few days. I wish it distinctly to be understood I only want extra-fine specimens of any species noted in my "wants," because I already possess complete series, and have in duplicate many that I have noted as wanting, only I want to replace the specimens with better ones.—J. B. HODGKINSON, 16, *Bolton Street West, Preston; December 2, 1856.*

Greedy Collectors.—I had the good fortune last summer to capture those rare moths the Siliceous Pet, the Saucy Beauty, the Crescent-bearer, the *Allsopia paleales*, and one or two other equally fine things, and I exhibited them at a meeting of the Entomographical Society. The next day I was surprised, not a little, by two letters begging I would let the writers have *fine specimens* of my rarities in exchange for some rubbish or other, I forget what, for I put the letters in the fire. I fancied it was rather strange that two strangers should write at the same time for these insects: I had never been so served when collecting other objects of Natural History than insects, but I, it seems, had something to learn. I told a friend about the circumstance, and he said it would be wonderful if you had not been written to. Said I, "Why I have not told you the names of the writers." "No," said he, "but I know them; the parties always hunt together; they generally get on the scent at the same time; they are like S and T in the alphabet, close to each other. Avoid such men; all they want is to enrich

themselves at your expense, as they have done at the expense of many a young beginner already. Directly they hear of captures, it may be as in your case, of single specimens, they try to make sure of you, and write in the most blarney style." If any one is at all curious to know who these individuals are, let him take some rare moth and record the capture of it, and he will soon learn by being asked for fine specimens.—N. O. BRUCE, *St. John's; December 8, 1856.*

Attracting Male Moths.—The insects that I tried on the trees (p. 78) were *Biston prodromarius*, *Eriogaster lanestris*, and several small moths, the names of which I should not like to say, as I am not quite certain which they are. The first I tried was *Biston Prodromarius*; and in less than an hour I captured the male.—W. H. FREMLIN, *Wateringbury; December 6, 1856.*

An Instance of one of the many Reasons why we prize certain Insects of our own capturing, be they Rare or otherwise.—I always had a penchant for *Pyrausta octomaculalis*. It was one of those insects that caused me to turn my attention to the Lepidoptera, in preference to any of the other orders, but I did not possess one. I saw that species in almost every cabinet except my own, and when a friendly parcel arrived, my first exclamation, on opening it, was, "No *Octo.* yet!" One day, while beating in Knock Wood (how appropriate a name for the scene of entomological verberations!), I espied an "eight-spot" hovering among low bushes: I made a desperate sweep with my net—but

in vain, and *Pyrausta octomaculalis* remained a blot in my entomological escutcheon until last year. One beautiful June day, 1855, hovering over low flowers in a hedge, another *Octo.* set my heart-strings on the stretch. (N.B. It is not expedient to draw one's purse-strings in adding a new species to the cabinet.) Excited I was, for there is no mistaking the insect's appearance. Feeling sure of my prize, after a careful aim, I succeeded in taking the little fluttering captive. Did this specimen grace my cabinet? Alas, no! in my anxiety to secure it, I permitted it to escape through one of those rents that *will* come in our nets, severely imposed by exacting brambles. June 25th of the same year,—a day ever to be marked with a white stone,—I not only caught, but also secured a beautiful specimen of my favourite. Though more successful this year, I still highly value my first *Pyrausta octomaculalis*.—S. C. TRESS BEALE, *Ivy Court, Tenterden.*

EXTRACTS.

PEST OF LOCUSTS.—A host of locusts has invaded the districts of Odessa, Ananieff and Robvior. The following fact gives an idea of the enormous numbers of these insects. A gentleman living in the neighbourhood of Odessa invited a large party to a fête at his country-house, and in the evening the place was splendidly lit up with lamps, Bengal lights, &c. Sumptuous sideboards were laid out, and a brilliant and select company had assembled. All looked forward to a merry evening. The windows of

the apartments had been opened, and a refreshing breeze was entering the rooms, when suddenly a loud noise was heard, and a few moments after myriads of locusts filled the rooms, the gardens, sleeping-chambers, and every part of the villa. Fireworks, rockets, &c., were discharged, in the hope of driving away these troublesome guests, but in vain. The company were compelled to leave.—*Edinburgh Weekly Herald*.

OBITUARY.

We regret to observe the loss science has sustained in the death of a useful and energetic entomologist, Henry de la Chaumette, Esq., of Gloucester Terrace, West Green Road, Tottenham.

The readers of the 'Zoologist' will recollect the series of articles which appeared there some years ago from his pen, descriptive of the larvæ of the Sphingidæ, both British and Continental.

DEATH OF MR. DAVID DYSON, THE NATURALIST.

We announce with deep regret the death of Mr. David Dyson, of Manchester, a well-known naturalist, at the early age of thirty-three years, which took place at one o'clock in the afternoon of Wednesday, the 10th inst., at the residence of his brother, Mr. John Dyson, Woodbine Cottage, Rusholme. The cause of his death was ulceration of the larynx.

Mr. Dyson was born at Oldham in April, 1823, and his early years

were passed as a factory worker; but he very soon evinced a passion for collecting insects, and spent every available penny of his hard earnings in the gratification of his love for Entomology. He subsequently devoted himself to making collections in Ornithology and Conchology. His ardour in these pursuits led him, in 1843, to undertake a voyage to the United States of America: he was then twenty years of age, and quite unknown beyond his own neighbourhood, and unfriended, for his own savings and some money given him by his elder brother furnished him with such scanty means for his voyage that, on landing in New York, he had only a few shillings left. His industry and energy, however, enabled him to make a tour in his new profession as collector through the States, across the Alleghany Mountains, and as far as St. Louis, earning the means of subsistence on his way by selling portions of his collections in Natural History to the local museums. After an absence of less than twelve months he returned to England with upwards of 18,000 specimens of insects, birds, shells and plants. This collection was found to contain some very rare specimens, and his success was the source of amazement almost among the leading naturalists, and the late Mr. Hugh Strickland invited him to his father's residence, Cracombe House, Worcestershire, and attempted to engage him, on behalf of himself and a number of other gentlemen, to make a second voyage to America, but the negotiations failed. Being then near London, he took the opportunity to visit that city for the first time in his life, and

found, to his surprise, that his fame as a collector had preceded him thither. At the British Museum he found that the intelligence had reached them of his recent visit to Sir George Strickland's, and an engagement was offered him to go out in search of specimens to Central America, which he accepted.

In corroboration of the statement that he thus early became acquainted with some of the leading naturalists, it may be mentioned that Mr. Edward Doubleday speaks of him in an article on Lepidopterous insects in the second volume of the 'Zoologist,' published in 1844, as "an intelligent young man, originally a weaver at Oldham, whose zeal for Entomology carried him out last year to the United States."

He started for Central America on the 17th of September, 1844, and landed at Belize on the 3rd of November. He remained in Honduras till the latter end of 1845, actively engaged in his vocation, and in the deadly swamps of that country contracted disorders which undermined his constitution, the immediate cause of his return being a sun-stroke at Belize. He was eminently successful, however, and returned to England, after forwarding an extensive and varied collection of insects, shells, birds and reptiles. His collection included an extensive variety of orchideous plants. In this tour he also executed several commissions for the late Earl of Derby and others in live and dead specimens, which were added to the already magnificent aviary and museum at Knowsley. Some of his collection of plants were also presented to the Manchester Botanical Gar-

dens. The chief result of this enterprise, however, was the addition of many thousand specimens to the British Museum.

In 1846 he went out to South America for the British Museum, and travelled in Venezuela, carrying with him many valuable introductions. He was accompanied by his brother, Mr. Amos Dyson, and they returned after an absence of about eleven months, his collection on this occasion including a great variety of humming birds, moths, beetles and shells.

In the latter part of his life Conchology became his favourite study, and he has left behind him a private collection, numbering upwards of 20,000 shells, many of them very rare, and including more than 10,000 different species. He has also left a large collection of birds and insects. These collections, it is said, are very valuable, and equalled by few out of London, and it is hoped that an effort will be made to secure them for some of the local public museums. Mr. Dyson succeeded Mr. Louis Fraser as curator at Knowsley, and he held that responsible situation up to the death of the late Earl of Derby, when the specimens of Natural History collected there by that nobleman were sold. Some years ago he resided for a time with Mr. Cumming, of Gower Street, London, and assisted that gentleman in the arrangement of his extensive collection of shells. He was altogether a self-educated man, and, notwithstanding early disadvantages, his acquirements were considerable. His kind and gentlemanly bearing gathered about him a large circle of highly cultivated men, whose esteem he

returned to the last.—*From the 'Express' of December 12th.*

UNIVERSITY INTELLIGENCE.

Oxford, December 3.

ENTOMOLOGICAL SOCIETY.

The Oxford University Entomological Society held its first meeting for this Term on Tuesday last. Meetings will take place in future on alternate Tuesdays during Term time, and the first for next Term will be held on Tuesday, January 27, at eight o'clock in the evening.

The above startling intelligence we quote from the *Morning Chronicle* of December 4th. Mr. Hope's collection appears to be producing fruit.

Now ready, price 3s. 6d.,

THE WORLD OF INSECTS; A GUIDE TO ITS WONDERS.

By J. W. DOUGLAS,

Secretary to the Entomological Society of London.

"A charming volume, redolent of the fields and garden, and discoursing most agreeably, as well as learnedly—*corde et manu*—as its motto says. Mr. Douglas is not only an excellent entomologist, but a man of refined literary tastes also, and sees into the heart and poetry of his science. He is the very man to win proselytes; for let the reader be where he may, Mr. Douglas will open for him a world of wonders."—*Northampton Mercury*.

John Van Voorst, Paternoster Row.

Second Edition. Price 3s.

THE ENTOMOLOGIST'S COMPANION.

By H. T. STAINTON.

Contents.

How to catch Micro-Lepidoptera.

Where to catch Micro-Lepidoptera.

When to catch Micro-Lepidoptera.

To collect the Larvæ of Micro-Lepidoptera.

Table of appearance of British Tineina.

Calendar of British Tineina appearing in the Imago state.

On the Habits of Tineina Larvæ.

Calendar of British Tineina appearing in the Larva or Pupa state.

How to rear Micro-Lepidoptera from the Larvæ.

How to kill Micro-Lepidoptera.

How to set Micro-Lepidoptera.

Entomological localities.

Ten Days at Kilmun, with a Trip to the Isle of Arran.

On the necessity of the Collector keeping a Journal.

Journal of a Larva Collector in 1853.

John Van Voorst, 1, Paternoster Row.

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, December 20, 1856.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 10.] SATURDAY, DECEMBER 27, 1856. [PRICE 2d.

SCIENTIFIC ENTOMOLOGY.

ON another page of this day's 'Substitute' we print an extract from a letter of a "labourer," which has given us more pleasure than anything entomological we have read for a long time. It details the method the writer used to discover the name of an insect he had found, and the method was so logical and true that we hope a perusal of it may induce more collectors to follow it than now adopt it. We hope this for the sake of the collectors themselves, because it is a step in advance of their ordinary position when they are able to take up an insect, and, by referring to a book of descriptions, find out what it is. A man who can do this is in advance of his fellows, not simply because he thereby knows some things of which they are ignorant and careless, but because, by means of the educational process of training his mind undergoes before he can attain the facile exercise of its analytical and synthetical powers,

he is in a position to ask for, and obtain, the why and because of the circumstances that operate upon him from all sides, and fashion his life and character. He may thus render himself, to a certain extent, above circumstances, or at any rate make himself reconciled to what he sees is caused by the action of laws of Nature to which he must submit. The man who can trace out the family, genus and species, of a moth or any other insect, has obtained the "open Sesame" of the arcana of Nature's secrets; he sees not merely the fact which he set out to seek, but the connection with others just beyond the circle of his observation, which continually widens, and its horizon grows clearer to his strengthened and enraptured vision. He cannot but be impressed with the idea that Nature has a system of order and gradation, that all the forms and developments are planned and provided for as necessary parts of one great whole. At this condition of intelligence surely a great proportion of our collectors ought to arrive; then, besides the benefits

to themselves we have endeavoured to point out, there would result the advantage to Science that so many more persons being able to discriminate and point out (very different things by the way) variations in form and structure, the observations they made would be serviceable in verifying facts already noted, or in detecting new ones, and would have a value that the enquiries of a less accurate set of men do not and cannot possess. Let our correspondent's proceedings, then, serve as a model for the manner in which collectors of insects should set to work at the science of their subject. A *bonâ fide* case in point like this, showing how the thing *has* been done, is better than a hundred discourses how it *might* be done. It is true that, with several Orders, the want of cheap and good Manuals of descriptions would be much felt, but we have faith enough in earnestness and perseverance to believe that if a certain number of men will a thing, that thing can be accomplished. Only let the demand for these books come, and it will be supplied.

question brought forward at the last meeting of the British Association for the Advancement of Science, "Whether any measures could be adopted by the Government or Parliament that would improve the position of Science and its cultivators?" This letter is an able exposition of the position of those who cultivate Science from a love of it, but are obliged to get a living by their labours; and while the author is opposed to a general endowment of Science by the Government, he does not fail to urge an adequate payment of the scientific men in the service of the nation. We can only find room for the concluding paragraph. "We frequently hear the complaint made, that among the students of Science there are but few who take up its pursuit with earnestness and devotion, the great majority contenting themselves with a smattering; and also that the scientific professorships are not remunerating. Both these circumstances are the natural result, as it appears to me, of the evil to which I am anxious to direct attention. How can it be expected that young men should pay for instruction, and devote their whole attention to qualify themselves in a study, the remuneration for which (in the few official situations connected with it) is vastly inferior to what may be acquired by the devotion of much less time and talent to almost any other kind of occupation? The remedy lies, not in increasing the number of professors, but in fairly recompensing the holders of scientific offices, and thereby rendering those positions desirable as a means of securing a respectable living."

Dr. J. E. Gray, of the British Museum, has printed a letter (copied in 'The Literary Gazette' of Nov. 8th) in answer to the

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER ROW, as well as of the Publisher.

Several communications only wait for room.

J. LINTON.—The fault rests with your bookseller. 'The Substitute,' we repeat, is *invariably* ready at Messrs. Kent & Co. on the Friday.

DUPLICATES AND DESIDERATA.

Lepidoptera wanted.

Ægeria Bembeciformis,
Sesia Fuciformis,
Acherontia Atropos,
Phragmatobia Urticæ,
Orgyia cænosa,
Clisiocampa castrensis,
Pœcilocampa Populi,
Endromis versicolor,
Limacodes asellus,
" testudo,

Platypteryx unguicula,
Cerura furcula,
Notodonta cucullina,
" Carmelita,
" Dictæa,
" tritophus,
" trepida,
" Chaonia,
" dodonæa,
Ptilophora plumigera,
Gluphisia crenata,
Semaphora tridens,
Acronycta Alni,
" strigosa.

Duplicates.

Papilio Machaon,
Colias Edusa (males),
Thecla Rubi,
Polyommatus alsus,
" Argus,
" Corydon,
" Agestis,
Argynnis Aglaia,
" Cinxia,
Arge Galathea,
Satyrus Semele,
Pamphila Comma, [mis,
Trochilium Ichneumoniformis,
Macroglossa stellatarum,
Lithosia rubricollis,
" complana,
" pygmæola,
Setina irrorella,
Callimorpha dominula,
Petasia cassinea,
Notodonta Dromedarius,
Apatela leporina,
Acronycta Ligustri,
Ceropacha Or,
Leucania littoralis,
Nonagria Phragmitidis,
Triphæna fimbria,
Noctua C-nigrum.

[To be continued.]

H. J. HARDING, 1, York Street,
Church Street, Shoreditch; Dec.
8, 1856.

Erratum.—Page 88, for
Lozotænia dumetana, read
semialbana.

—R. W.

CAPTURES.

Carabus intricatus.—I purpose sending to the next meeting of the Entomological Society four living specimens of *Carabus intricatus*, taken by myself under moss in a wood in this neighbourhood within the last month. This is one of those British insects captured by that celebrated naturalist Dr. Leach, the authenticity of which has been doubted; but why his word was not taken I am at a loss to know. Collectors have paid flying visits of one or two days to this locality without finding it, but such visits, without luck, do not prove that certain things are not in certain places — J. J. READING, 42, Gibbons Street, Plymouth, December 13, 1856.

Glæa erythrocephala.—I will also exhibit at the same meeting no less a rarity than *Glæa erythrocephala*, taken at sugar by me last month. It has been compared with the unique British specimen of Mr. H. Cooke, and that gentleman states that, like his, mine is not the typical insect, but the variety *glabra* of Duponchel.—ID.

COMMUNICATIONS.

How I Named my Captures.
—In September I met with a gaily-coloured Lepidopterous insect, and was anxious to learn its name, consequently I had recourse

to the ‘Manual of Butterflies and Moths.’ At page 10 I was instructed that the antennæ of the butterflies have a club-like termination, which was not the case with the insect in hand, so I dispensed with the instructions between pages 10 and 72. Seeing at page 72 that the antennæ of the moths are without a club-like termination, I gave the insect the name Moth. After receiving the instructions at page 73 and a few subsequent pages, I became familiar with the nine groups into which the moths are divided, and I referred the moth to the second group *Bombycina*. At page 107 the *Bombycina* group is divided into twelve families, and the description of the sixth family is as follows:—“Wings variegated; hind wings brightly coloured and spotted, abdomen coloured; antennæ of the male pectinated.” And as the moth agreed with the description, I at once referred it to the sixth family *Chelonidæ*. After obtaining the instructions at pages 142 and 143, together with the descriptions of the ten genera, I referred it to the third genus, “F.-w. streaked and spotted;” and when I had read the generic and specific description at page 145, I was satisfied that the name of the moth was *Arctia caja*. In the ‘Intelligencer,’ page 156, a correspondent asks some one to remove the obstacle that lies in the way of the unclassical entomologist, and wishes to become familiar with entomological language. I would say he must do the work himself; he may be assisted, but no one can do it for him. Two hundred and forty pages of the ‘Manual’ have appeared; let him

furnish himself with these and examine the insects according to the above rule; by so doing he will by degrees remove the obstacle, and by-and-bye become familiar with entomological language. — H. SCOTT, *Labourer, Eaves Lane, Chorley, Lancashire; December 8, 1856.*

Leiocampa Dictæa.—At page 5 of 'The Substitute' Mr. Cartmel tells us that he took fifty brown and green larvæ of *Dictæa*, which fed exclusively on *birch*. Will he pardon me for asking whether he is certain of their being *Dictæa*? I never knew the larva of that species to feed on birch.—REV. J. GREENE, *Playford, Ipswich.*

Forcing Lepidoptera.—At page 69 of 'The Substitute' I observe Mr. Clarke asks for any information respecting the forcing of Lepidoptera. When desirous of obtaining early specimens of any insect I put the pupæ into a box with a very thin layer of earth, about February. The box I place upon the chimney-piece, in a room where a fire is burning all day, by which means I have obtained specimens many weeks before their usual time of appearance in the perfect state, as for example:—*A. megacephala* on the 8th of April; *D. capsicola* on the 11th; *C. Verbasci* on the 14th; *S. Ligustri*, *C. curtula*, *N. dodonæa* and *Camelina*, on the 15th, &c., &c. I never found any injurious effects follow.—ID.

Lasiocampa Quercus.—One of your correspondents states that he never saw or had a larva of *L. Quercus* that made its cocoon in the autumn. With two exceptions, I have not bred the insect for a long time, but on both these

occasions it turned to a pupa at the end of August. One larva I found in May (I suppose it had hybernated) feeding on bramble. It was then fully $2\frac{1}{2}$ inches in length, very slender, with rusty hairs, and lilac rings. For some time it was sulky, but at last condescended to eat, spun up in August, and came out the following June (end of) a male. Whether this be *L. Callunæ*, or not, I cannot say, but, with the exception of its being a little larger and darker, I see no difference between it and the ordinary *Quercus*. I must add, however, that there certainly are some marked differences in the larvæ, e.g., the lilac rings, which, if I mistake not, are wanting in *Quercus*. This larva was taken in *Suffolk*. I will now conclude these rambling remarks with an expression of the gratification I have received in reading the highly interesting and instructive notes by M. Guenée, translated in the pages of 'The Substitute,' a feeling in which, I think, all its readers will coincide.—ID.

Acrolepia pygmæana.—Would you be so kind as to inform me whether *Acrolepia pygmæana* is double-brooded or not? In the 'Entomologist's Companion' I see it is said to be in the perfect state in May, but I am given to understand, by a friend, that a young and indefatigable entomologist, of the name of Latchford, has bred a dozen or two in October this year. Can this be true?—H. JONES; *December 8, 1856.*

[*A. pygmæana* is in the larva state from July to September; the moths appear in October, but rarely fly: they hybernate, and fly in April and May succeeding.]

*An Entomological Ramble in the
Isle of Wight.*

[Continued from p. 81.]

Again are we fated to be roused from our repose; but this time the cause is neither *bees* nor other insects, for behold! the wrathful visage of an elderly rustic (appropriately armed with a scythe of huge dimensions) appears above the neighbouring hedge, and a voice demands of us, in no gentle tones, "What we're a-doin' of in that clover?" We pretend not to hear him, and whistle "Pop goes the Weazel;" but on the question being repeated in a voice of thunder, and the voice being followed up by the gaunt person of the querist, we feel that it's time to acknowledge his presence, so we accost him with "Good morning to you!" in a most bland and cheerful voice. This evidently somewhat surprises him: but he soon returns to the one great thought occupying his mind, viz., that we are in *his* clover; so, without returning our salutation, he informs us, in a somewhat milder tone, that "There's a path in this here field, and that that 'ere path is for folks to walk on, and —" "What an extremely fine crop of clover?" we exclaim, turning round rather slowly to admire the field, "Is this all your property?" "'Eas, sir, it be all mine: and when folks comes a-walking through my fields, why they'd better be keeping to the path, or maybe —" "I suppose you don't do much in this way," return we, showing him our day's collecting (for we perceive he's returning to the old idea), "You don't collect British Lepidoptera, do you? Per-

haps only the *Rhopalocera*?" "Why, they're only flies!" says the rustic in a contemptuous tone, "What's the use o' they, I should like to know?" "Perhaps," we reply with dignity, "you are not aware that these flies are worth a good deal of money: these few I have taken to-day I would not part with under five shillings?" "Lor, sir! you don't mean that, do you? Five shillin'! Why, I can get bushels on 'em!" "Of course it depends entirely on the rarity of the respective species as to what price they will fetch," we observe; "and if you can bring any good ones to Pomona Cottage, I shall be happy to give you something for your trouble." "I'll soon get ye some fine 'uns, I lay!" exclaims the pacified husbandman. "Very well! dont forget! Pomona Cottage. Good day to you!" "Good marnin', sir! I'll bring ye up some flies to-morrow, for I knows a capital place fur 'em, that I does!" We walk slowly towards the copse, inwardly rejoicing at having gained a friend instead of a foe, and wondering what sort of insects our new acquaintance will bring us, when our meditations are interrupted by the sudden appearance of *Arge Galathea* (a welcome vision, for we have not beheld it alive for two years), and we rush after it (to the astonishment of our country friend, who has been gazing at us ever since we last spoke to him). It is soon captured and pinned, and we are pleased to see that it is a fine dark male specimen. A large clump of Ragwort next presents to our view a host of *Anthrocera Filipendulæ*, amongst which we find a single specimen of *A. Lonicæræ*;

and though we search for some time no more of the latter species are forthcoming. We next determine to castigate the bushes in our vicinity, and commence on the brambles and nut-bushes. After two or three blows a yellow moth flies out; we bag it, and for the first time in the day do not recognise our capture. (We afterwards found it to be *Harpalyce Pyrahiaria*.) We continue our beating, and catch consecutively *Harpalyce russaria*, *Ennomos il-lunaria*, *Eupithecia subfulvaria*, and lastly *Harpalyce picaria*. Beating in July is hot work, so we rest for a few minutes, leaning on our beating-sticks. Suddenly, over a tall head of *scabious*, we see an insect appear in an instant of time, that it seems wonderful where it can have sprung from, and we almost fancy that, like the Eastern genii, it has been developed from the air. The graceful tapering form and long slender proboscis, at once show it to be *Macroglossa stellatarum*. We do not know whether to strike at once, or to wait for a better opportunity. Alas! that delay is fatal to our hopes; for, in another instant, seemingly without the slightest effort, the rapid insect is whisking over the highest trees, disappears from our view, and reappears no more. The position of the sun now shows us that it's time to return to our cottage, if we entertain any thoughts of dinner; and so, reluctantly, we turn our steps homewards. On the way, by a sudden lucky stroke, we entrap a specimen of *Lasiocampa Quercus* in full career; and after vainly endeavouring to squeeze the life out of him, we are forced to pin

him alive, though much against our inclination. The only other captures made during the walk consist of *Triphæna Janthina* and *Triphæna interjecta*, both of which we beat out of an ivy-bush. At length hot, tired, and soundly Diptera-sucked, but in the best of tempers, we regain our cottage, and soon our setting-boards wear a motley appearance, well-pleasing to our entomological eye. * * * * And now it only remains for me to thank the Editor of 'The Substitute' for his kindness in inserting these rambling reminiscences of a stroll that afforded me much delightful occupation; and I cannot help thinking how dull and uninteresting, comparatively speaking, such a walk would have been had I not been alive to entomological sights and sounds. How far the perusal of Mr. Stainton's delightful works (which, in my estimation, are to Science what Macaulay's are to History,) has fostered and increased in me that love for insects, which I have always possessed, I need not say; for I feel sure that every incipient Lepidopterist will agree with me, that never before has the science of insects been presented to us in so interesting and enchanting a form. — ROLAND TRIMEN, 71, Guildford Street, Russell Square.

Are all Lepidopterous Insects infested with a Parasite or Ichneumonidæ?—I am induced to ask this question from having bred, during the last six years, nearly 400 of *Macroglossa stellatarum*, and have never yet had a larva but what produced a perfect insect. If any of the numerous readers of 'The Substitute' has ever had the luck to breed a

parasite from this larva and will lend a specimen with its case to me I shall be much obliged. This larva, feeding as it does on the tops of the *Galium* in the most exposed situations, it seems strange that birds and parasites do not attack it. About two years ago I stated this at the Society of British Entomologists as reported in the 'Zoologist,' and I was replied to by a correspondent of the 'Naturalist,' under the signature of "Bombyx Atlas," who, I think, stated that he had bred one. If "Bombyx Atlas" is still in the perfect state, and this should meet his eye, and he will drop me a note on the subject, the favour shall not be forgotten.—H. J. HARDING, 1, *York Street, Church Street, Shoreditch*; Dec. 11, 1856.

Announcements of Duplicates.—It was with great surprise I read, at p. 78, the statement of one of your correspondents, signing himself "One of the Sufferers," of the illiberal treatment he had met with, and I should not do justice to my feelings if I did not state how very different my experience of my entomological brethren has been. I am not aware that I ever made an application for assistance which did not receive an immediate and courteous reply, and I have often read the letters of my correspondents to my friends, as evidence of the good feeling, liberality and interest in one another's pursuits which, I think, distinguish entomologists, even when total strangers to each other. I am sure I have seldom been able to make an adequate return for what has been sent to me, and if it be true that "most of your readers" will

only part with an insect when they are offered a *quid pro quo*, I have been singularly fortunate, for all my correspondents seem to belong to the minority; and, on removing to this country, it was a pleasant anticipation that, on new ground, I might perhaps have an opportunity of repaying some of the load of obligation I was under to many gentlemen personally unknown to me. Perhaps, if your correspondent will have a little patience, he will get both answers and insects; an offer of duplicates in the 'Intelligencer' or 'Substitute' often overwhelms an entomologist with applications, which he may not have leisure time to reply to at once. Every one must speak of the world as he finds it: my experience is that a stingy, bargaining spirit is very rare among entomologists.—EDWIN BIRCHALL, 27, *Eden Quay, Dublin*; Dec. 8, 1856.

The Cabinet Question.—I am able to confirm your remarks, that hitherto absurd prices have been paid for cabinets. I was wanting one, and, on making inquiry for the best place to secure a good substantial article, was referred to London, with the additional information that I should have to pay a guinea per drawer. Now I knew sufficient of materials and labour to satisfy me that this was an exorbitant price. About a month ago I engaged with a person in this place, to whose work-rooms I could have constant access to enable me to superintend the construction of one. I furnished the design, we together selected the wood,—good foreign walnut in the solid for the case and yew for the fronts of the drawers; the latter a very

pretty material for that purpose. I have no partitions between the drawers, they riding on runners working in grooves in the sides of the drawers, thus saving wood, labour and considerable space; the folding-doors are panelled, the tops of the panels being elliptical; this is the only ornament, except the usual plinth and top nosing. The cost to me, including lock, bolts, &c., is a trifle under 5s. 6d. per drawer. It still wants corking and glazing: I have purchased the cork three-sixteenths of an inch thick, machine-cut; this will cost me 11d. per drawer of $15\frac{1}{2}$ by $16\frac{1}{2}$ inches,—of course I do the laying myself; the glass I have also procured, which costs me 9d. per drawer. I thus get a really good substantial walnut cabinet complete for a trifle over 7s. per drawer: in mahogany it would be something less. I ought to mention that I do not have frames for the glass, a rabbet is provided, and the part on which the glass rests is laid with narrow velvet, or the glass itself could have the velvet attached: this soft bed effectually excludes dust, and a clear view of the insect is thus obtained, so much obstructed by the heavy unsightly frames generally used, effecting a saving, too, of about 2s. per drawer. The “benefactor,” therefore, of whom you spoke, is found. The person who constructed mine is ready to do the like again, charging merely for materials and labour. I should be glad to give further information to any one and to superintend the making, as in my own. — GEORGE GASCOYNE, *Newark, Nottinghamshire; December 8, 1856.*

EXTRACTS.

THE STUDY OF ENTOMOLOGY.

[Continued from p. 35.]

“If Entomology had no higher claim to our respect than as an interesting amusement, supplying employment for the idle, we should be among its patrons; for something is gained when a human mind is rescued from inactivity and fixed upon an object of research, especially if that object be a part of the great kingdom of Nature. But to speak of the Science as if this were its only purpose would be derogatory to its claims, and in the highest degree unjust to the many intelligent, educated men, who, with great powers of observation and research, have devoted their time to the study of insects. Entomology explains the economy of a world which to most men is as novel as if it were a new creation. The insect world, minute as are its inhabitants, is one in which we discover the existence of all the affections and passions actuating and governing vertebrated animals. Here, as in other kingdoms of Nature, we perceive the effects of oppression and of fear, of courage and of timidity, of the avarice of accumulation and of the indulgence of selfishness. Among the pigmy individuals of this great kingdom we observe in some a cruel indifference to the rights and lives of others; in some an amiable love of offspring and attachment to friends; and among them all, in an exaggerated degree, those peculiarities of habit and temperament, and those contests and

struggles so common in the societies of larger animals and among the nations of mankind. Some insect-families live in sunshine and feed on nectar; some in darkness and filth, preying on carrion; some are timid, but out of sight of their enemies pass their lives in enjoyment, with no weapons of attack and few of defence; others are bold, violent in passion, and cruel in deed, and are armed with horns, and stings, and fanged jaws. The insect world is a world of activities. Each individual has work to do, and is provided with the tools he will want and the instinct to use them. If war be his avocation, he is supplied with lance and sword, with which he fights bravely, conducting his predatory expeditions with caution, but without fear or mercy. If he be a carpenter he carries with him an augur or saw; if a mason he is competent to his work, and has the right tool to execute it skilfully. Some are clothed in gay garments, and spend a short life in selfish gratification; some are clothed in disguise to protect them from their enemies; some have a lustre to frighten their pursuers, and some an armour which defies their power. The caddis-worms of the angler are the larvæ of *Phryganeæ*, and in the clear, shallow pools, where they are found, look like sticks, straws or stones, according to their species, though a more close examination will detect the projected head and legs quickly drawn into the rough case on the approach of danger. Other insects are protected from the scrutinizing search of their enemies by their resemblance in colour or form to the leaves they inhabit, of which

we have an example in the wings of the lappet moth (*Gastropacha Quercifolia*), which resemble brown leaves both in form and colour. The brilliant hues of some insects attractive to us are probably given that they may dazzle the eyes of their enemies and escape their attacks. Some insects are covered with armour, like many of the *Coleoptera*; some are the *Pachydermata* of the insect world, and are by their thick skins protected from injury, like the common forest-fly (*Hippobosca equina*); some are as well protected by spines, bristles, or stiff hairs; while others, like the timber-boring beetle (*Anobium pertinax*) and the spiders, simulate death to escape the murderous attack of their enemies. The inhabitants of such a world, designed by Omnipotence and an essential part of the great scheme of organised life, cannot be uninteresting or unprofitable objects of study for the highest intelligence, though they are among the smallest of living beings. None of them are vocal, and few produce sound audible to man, but they have means of communication one with another, and exhibit all those evidences of sensibility, passion and affection, which, when observed in the reasoning creature—man, are justly believed to be the principal and most important study of the human mind.—*Eclectic Review*. —

NOTES ON NOCTUÆ: FROM
GUENEE'S NOCTUELITES.

[Continued from p. 83.]

Pachetra.

This genus consists of a single European species. The larva,

which is similar in habit to those of several genera in this family, has a rather curious peculiarity, which consists of a certain velvety appearance, which is not due to any down, but rather resembles an efflorescence like that which covers certain chrysalides, but yet it is not of that nature, and does not come off on being handled, but it is very appreciable to the touch, and feels like a very fine velvet. The caterpillar lives in winter in the middle of tufts of grasses, in woods. The perfect insect passes its life sitting on the trunks of trees, and flies seldom even at night; very different in that respect from *Heliophobus popularis*, with which it has otherwise some relation. (Vol. I., p. 177.)

Cerigo.

This genus of Mr. Stephens, which I had previously adopted, but in which I was wrong to include *prospicua*, oscillates like many of its allies between *Apamidae* and *Noctuidæ*. In form, indeed, it completely recalls to one that division of *Agrotis* which includes *forcipula*. Nevertheless, the abdomen is slightly crested, and the roof-shaped position of the wings in repose have determined me to place it here. The larvæ are somewhat similar to those of certain *Leucanidæ*: they live much concealed, and live exclusively on grasses: they live through the winter, and acquire their full size in the spring, but they are delicate; and although the broods are numerous, but a small number arrive at the perfect state. (Vol. I., p. 179.)

Luperina.

I had before adopted this genus of M. Boisduval, which appeared to me founded on good characters, but, far from approving of the considerable extent which he has given it in his genera, I have still further restricted it than I had done in my Index. Reduced as it now is, it still consists of two very distinct groups, which here require a separate history. The larva of the first group (which consists of a single species not yet found in Britain—*luteago*) have nearly the manners of *Gortyna*, that is to say, that they excavate in the roots of certain plants galleries in which they advance by degrees, as they empty them by eating them; but they only inhabit the stems when quite young. Besides, the chrysalis is not enclosed in the gallery where the larva has lived, so that the perfect insect does not issue by an opening formed beforehand as in the truly endophagous larvæ. A consequence of this manner of living is, that the female of the perfect insect is provided with a long ovipositor, as in *Dianthecia*; and as the larva feeds on Caryophyllææ, M. de Graslin, who has published an excellent memoir on the habits of *Luteago* (in the 'Annales de la Société Entomologique de France,' 1842, p. 313, pl. 13,) on the faith of this apparent conformity, places it in that genus; but even the manners of this caterpillar, the general appearance of this perfect insect, its robust legs, the conformation of its head, and even the markings on its wings, show that it cannot be united with *Dianthecia*. It has, on the contrary,

especially in its perfect state, all the characters of *Luperina*.

The larvæ of the second group live concealed, but not in the interior of vegetables: they are of dull colours, and resemble in manners the *Xylophasiæ*. The perfect insects have all a strong family likeness: they are sluggish, especially the females, of which the abdomen is stout and very elongate. (Vol. I., p. 180.)

[To be continued.]

PUPA DIGGING.

THE REV. J. GREENE'S
Elaborate Instructions for Digging the Pupæ of Lepidoptera during the Winter and Spring Months will appear in the January number of the 'Zoologist.' This is the most important contribution to Entomology that has been published for many years.

John Van Voorst, 1, Paternoster Row.

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THE ENTOMOLOGIST'S
ANNUAL FOR 1856.

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Ghent to Glogau, and Stettin to Schaffhausen, in search of Entomologists.

Important New Works on Entomology.

List of Entomological Books now on Sale in London.

John Van Voorst, 1, Paternoster Row:

* A Supplemental List of British Entomologists will be given in the 'Annual for 1857.'

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, December 27, 1856.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 11.]

SATURDAY, JANUARY 3, 1857.

[PRICE 2d.]

THE NEGLECTED ORDERS.

To judge by the literature of Entomology in England, so much does the writing about *Lepidoptera* exceed that about all the other Orders, one would think that nearly all insects were Lepidopterous. We need not say that this is not the fact; but the collecting of *Lepidoptera* was first generally taken up, and has become fashionable, to the exclusion of nearly all the other Orders. Like other fashionable things there is much more show than reality; more of making collections than scientific study. But we might as soon think to change the fashion of ladies bonnets, by writing against it, as to make collectors of *Lepidoptera* into entomologists by writing at them: all we would ask of them is to believe they are not supreme. Coleopterists are of more modest pretensions, yet, if generally more scientific men, are still far from knowing what they might about the natural history of beetles: they think more about getting a species than knowing it,

except in its perfect state. As to the rest of the Orders, are there a dozen men in the kingdom who know anything about them beyond the merest generalities? It cannot be that they are intrinsically devoid of interest, for they are all beautiful, and their economy is quite as wonderful as anything in the favoured Orders. The reason why all but the *Lepidoptera* and *Coleoptera* are so much neglected, we believe to be that there are no good English descriptions, or no descriptions at all of the species to be had. The collector of them, if he would learn their names, must wade through a heap of continental books; and as this is not possible for the many, and too much labour for the few, it is not done at all. It is true we now have Mr. Walker's three volumes of Descriptions of British *Diptera*, but we fear the *Diptera* are too numerous to become popular, and these books too expensive to aid in making them so. Mr. Smith's Catalogue of the British Bees is so good that it ought to set some of us upon the study of these Hymenoptera. But for the rest all

is blank. The author of 'Glaucus,' in the third edition of that charming book, has dwelt upon this want in reference to the *Phryganidæ*, and has suggested a plan for supplying it, which we should like to see followed with regard to other Orders, each individual working out one or more Families. Here are his words:—"I said just now that happy was the sportsman who was also a naturalist, and having once mentioned these curious water-flies I cannot help going a little further, and saying, that lucky is the fisherman who is also a naturalist. Among gentlemen-fishermen so deep is the ignorance of the natural fly, that I have known good sportsmen still under the delusion that the green May-fly comes out of a caddis-bait, the gentlemen having never seen, much less fished with, that most deadly bait the 'Water-cricket,' or free creeping larva of the May-fly, which may be found in May under the river banks. The natural history of these flies has not yet been worked out, at least for England. The only attempt, I believe, in that direction is one made by a charming book, 'The Fly-fisher's Entomology,' which should be in every good angler's library. But why should not a few fishermen combine to work out the subject for themselves, and study for the

interests, both of science and their own sport, the Wonders of the Bank? The work, petty as it may seem, is much too great for one man, so prodigal is Nature of her forms, in the stream as in the ocean. But what if a correspondence were opened between a few fishermen, of whom one should live—say, by the Hampshire or Berkshire chalk-streams; another on the slates and granites of Devon; another on the limestones of Yorkshire or Derbyshire; another among the yet earlier slates of Snowdonia, or some mountain part of Wales; and more than one among the hills of the Border and the lakes of the Highlands. Each would find (I suspect) on comparing his insects with those of the others, that he was exploring a little, peculiar world of his own, and that, with the exception of a certain number of typical forms, the flies of his country were unknown a hundred miles away, or, at least, appeared there under great differences of size and colour; and each, if he would take the trouble to collect the caddises and water-crickets and breed them into the perfect fly, in an aquarium, would see marvels in their transformation, their instincts, their anatomy, quite as great (though not perhaps as showy and startling) as I have been trying to point out on the

sea-shore. Moreover, each and every one of the party, I will warrant, will find his correspondents (perhaps previously unknown to him) men worth knowing, not, it may be, of the meditative and half-saintly type of dear old Isaac Walton (who, after all, was no fly-fisher, but a sedentary 'pop-joy,' guilty of float and worm), but rather like his fly-fishing disciple Cotton, good fellows and men of the world, and perhaps something better over and above."

We had something more to say which we must, for want of space, reserve for another occasion.

Mr. J. C. Bowring, of Hong Kong, at present on a visit to this country, has just purchased the collection of Rhyncophorous Coleoptera of M. Jekel, of Paris, well known for his long and assiduous study of these beetles. This collection, consisting of more than 10,000 species, includes that of M. Gory and others, and is the richest ever formed in this section of *Coleoptera*. Mr. Bowring, although about to return to China, will not take this collection with him, but will deposit it in the British Museum for the use and benefit of his countrymen. Such munificence as this needs no comment, and is above all praise. But few persons have the power thus to confer a benefit on Science, and still fewer have the inclination to act with such disinterested liberality.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER ROW, as well as of the Publisher.

Several communications only wait for room.

Mr. Robert Drane has ordered and paid for certain numbers of 'The Substitute:' they were posted, as requested, to 22, Frederick Street, Cardiff, and have been returned "not known."

W. BUCKLER. — "Copland's Borneote of Petrolene" is sold in London by J. Sanger, 150, Oxford Street, in bottles at 6d. and 1s. each.

Letters received from T. W., E. G., G. G. and D. W., and forwarded to H. A. S. as requested.

DUPLICATES AND DESIDERATA.

British Coleoptera in Exchange for British Lepidoptera.—Having but lately commenced collecting *Lepidoptera*, and in consequence possessing few specimens for exchange, I should be glad to enter into correspondence with any entomologist who may be willing to receive *Coleoptera* for *Lepidoptera*. Of the former I have a large stock of duplicates, and as I do not like asking specimens without the possibility of making any return for them, will you make known my wishes in the pages of your useful little journal?—J. T. SYME, 12, Gordon Street, Gordon Square, London; December 11, 1856.

Lepidoptera for Exchange.—I have the following species of *Lepidoptera* for exchange.

Thecla *Quercus*,
Trochilium *Tipuliformis*,
Euchelia *Jacobææ*,
Orgyia *pudibunda*,
 „ *gonostigma*,
Hepialus *hectus*,
Ceropacha *diluta*,
Caradrina *cubicularis*,
 „ *blanda*,
Leucania *lithargyria*,
 „ *littoralis*,
 „ *impura*,
 „ *pallens*,
Hydræcia *nictitans*,
Miana *furuncula*,
 „ *fasciuncula*,
 „ *strigilis*,
Xylophasia *hepatica*,
Triphæna *fimbria*,
 „ *janthina*,
Cerigo *Cytherea*,
Noctua *umbrosa*,
 „ *bella*,
 „ *baja*,

Noctua *festiva*,
 „ *brunnea*,
 „ *triangulum*,
 „ *C-nigrum*,
Chersotis *plecta*,
Tæniocampa *gothica*,
 „ *munda*,
Orthosia *lota*,
 „ *macilenta*,
Anthocelis *lunosa*,
Cosmia *affinis*,
Xanthia *ferruginea*,
 „ *rufina*,
 „ *silago*,
 „ *cerago*,
Scopelosoma *satellititia*,
Polia *serena*,
Hadena *dentina*,
Euplexia *lucipara*,
Thyatira *batis*,
 „ *derasa*,
Xylina *lithoriza*,
Heliothis *heliaca*,
Abrostola *triplasia*,
Philopyra *Tragopogonis*,
Pyrallis *farinalis*,
Aglossa *cuprealis*,
Hydrocampa *lemnalis*,
 „ *Nymphæalis*,
 „ *Potomogalis*,
Ebulea *Sambucalis*,
Rivula *sericealis*,
Hypena *rostralis*,
Epione *apiciaria*,
Ennomos *angularia*,
Hibernia *aurantiaria*,
Biston *Betularia*,
Boarmia *repandaria*,
 „ *rhomboidaria*,
Hemerophila *abruptaria*,
Eubolia *multistrigaria*,
 „ *didymaria*,
Harpalyce *fulvaria*,
 „ *Chenopodaria*,
 „ *pyrallaria*,
 „ *achatiuaria*,
Bapta *temeraria*,
Ephyra *punctaria*,

Timandra imitaria,
 Odezia Chærophyllaria.
 I am in want of the following:

Colias Hvale,
 Thecla Betulæ,
 „ Pruni,
 „ W-Album,
 Pamphila Actæon,
 Procris Globulariæ,
 Nudaria senex,
 Phragmatobia Urticæ,
 Orgyia cænosa,
 Clostera curtula,
 Acronycta strigosa,
 „ auricoma,
 Simyra venosa,
 Hydræcia Petasitis,
 Luperina cespitis,
 „ Dumerilii,
 „ abjecta,
 Crymodes Templi,
 Noctua depuncta,
 Chersotis agathina,
 Spælotis ravidæ,
 Dianthæcia albimacula,
 „ Carpophaga,
 Eremobia ochroleuca,
 Hadenæ suasa,
 „ rectilinea,
 „ Atriplicis,
 Xylina rhizolitha,
 „ petrificata,
 „ semibrunnea,
 Aporophila australis,
 Anarta cordigera,
 Plusia inscripta,
 „ bractea,
 Abrostola Urticæ,
 Brepheos Notha,
 Hydrelia uncanæ,
 Odontia dentalis,
 Pionea margaritalis,
 Botys terrealis,
 Epione advenaria,
 Eupisteria carbonaria,
 „ quinquaria,
 Coremia Salicaria,
 „ Ligustraria,

Anticlea sinuaria,
 „ derivaria,
 „ Berberaria,
 Steganolophia Ribesaria,
 Harpalyce sagittaria,
 Cheimatobia autumnaria,
 „ filigrammaria,
 Ephyra trilinearia,
 Acidalia Blomeri,
 Timandra pratensis,
 „ emutaria,
 Hyria auroraria,
 Siona dealbaria,
 „ nivearia,
 Minoa Euphorbiaria.

—WILLIAM KIRBY, *South Street,*
Wandsworth, Surrey; December
15, 1856.

Lepidoptera.

DUPLICATES.

Papilio Machaon,
 Gonepteryx Rhamni,
 Colias Edusa,
 Lasiommata Ægeria,
 „ Megæra,
 Hipparchia Semele,
 Cænonympha Davus,
 Cynthia Cardui,
 Vanessa Polychloros,
 Polyommatus Artaxerxes,
 Thymele Alveolus,
 Chærocampa Porcellus,
 Hepialus Humuli,
 „ Sylvinus,
 Pygæra Bucephala,
 Phragmatobia fuliginosa
 (larva),
 Spilosoma Menthastræ,
 Lasiocampa Rubi (larva),
 Gortyna flavago,
 Glæa satellitia,
 Charæas graminis,
 Mamestra suasa,
 Calocampa vetusta,
 Scoliopteryx libatrix,
 Abraxas grossulariata,
 „ Ulmata,
 and some others.

DESIDERATA.

Leucophasia Sinapis,
 Arge Galathea,
 Argynnis Adippe,
 Nemeobius Lucina,
 Thecla Rubi,
 „ W-album,
 Polyommatus Argiolus,
 „ Corydon,

Steropes Paniscus,
 Procris Statices,
 Smerinthus ocellatus,
 Zeuzera Æsculi,
 Endromis versicolor,
 Cerura vinula,
 Notodonta Dromedarius,
 Pterostoma palpina,
 Clostera reclusa,
 „ curtula,

Psilura monacha,
 Porthesia auriflua,
 Euthemonia russula,
 Lasiocampa Trifolii,
 Eriogaster lanestris,
 Odonestis potatoria,
 Gastropacha quercifolia,
 Apatela leporina,
 Mamestra Persicariæ,
 Catocala Fraxini,
 Hipparchus Papilionarius,
 Pterophorus pentadactylus,
 „ pallidactylus,
 Alucita hexadactylus.

—DAVID P. MORISON, 49, *King Street, Perth.*

Lepidoptera.—I am in want of the following:—

Lithosia mesomella,
 Orgyia fascelina,
 Luperina connexa,
 Noctua Dahlii,
 „ depuncta,
 Orthosia Ypsilon,
 Euporia fulvago,
 Xanthia aurago,
 Polia serena,
 „ Chi,
 Aplecta occulta,

Aplecta tineta,
 Anarta Myrtili,
 Plusia inscripta,
 Fidonia plumaria,
 Nyssia zonaria,
 Coremia erutaria,
 Eudorea murana,
 Gelechia desertella,
 „ mundella,
 Elachista apicipunctella.

I cannot at present send anything in return; but if those who send me duplicates will state their wants I will endeavour to supply them. Boxes and stamps will be returned immediately. I should be much obliged if any one could assist me with the pupa of *Cerura vinula* and of *Hybernina progemmaria*.—C. KNIGHT, 19, *Darley Street, Leeds.*

COMMUNICATIONS.

Phlogophora empyrea.—In referring to my letters to you of the 20th and 27th of October, there appears some discrepancy. I made the captures of *P. empyrea* on the 14th and 18th of October,—three on the 14th and one on the 18th, making two pairs. Mr. Hemmings is in error in stating that I effected my captures on the 15th of October. Thinking that nothing but the truth should appear, I give the explanation.—GEORGE SMITH, 9, *King Street, Brighton; Dec. 13, 1856.*

Phlogophora empyrea, &c., at *Brighton*.—It appears that the observations made by myself and Mr. Winter and the editorial note in No. 1 of the 'Substitute,' have given offence to some individuals here; for various reasons, it was well known at the time those ob-

servations were penned that such would be the case. Several statements in reply have since been made, none of which, I think, call for any notice from me, but my friends in different parts of the kingdom have so strongly urged me to reply that I now consent, solely with a view to give those who know nothing of Brighton and its collectors a more correct idea of the position of things. Now then for Mr. Hemmings, and first let me thank him for his clear information ('Substitute,' No. 3) as to the capture of specimens: I place the most implicit reliance on the correctness of this statement. I have known Hemmings as a collector for many years, and I say confidently that I know no one less likely to have anything to do with passing off foreign insects as genuine British ones; but, at the same time, I must tell Hemmings that he has no right to grumble because other people have sources of information which he has not, or, as he phrases it, "are better informed" than himself. In this case I have the misfortune to be "better informed," and should be only too glad to be in a position to make active use of my information, but unfortunately, at present, I cannot do as I wish, for reasons he will hereafter see. I feel the more surprised at Hemmings, because he really is an entomologist. So much for Hemmings, and I now proceed to examine the statements purporting to be written by a man of quite a different stamp,—George Smith, of No. 9, King Street, Brighton. To those who know anything of Brighton and the relative positions of Smith and myself I must apologize for noticing

him. Well, this individual has given us no less than three different statements as to the captures of *empyrea* (see 'Substitute,' Nos. 3, 4 and 5), no two of which agree either as to dates or numbers,—indeed, the difference is so great that the editor no doubt thought they referred to different transactions, or he would never have been so far imposed on as to print the same story three times over in different terms: the last of these three statements is distinctly styled a "truthful" one; is this intended as an admission that the two former were intentionally false? That *empyrea* has been captured I know perfectly well, but I beg to say most distinctly that I do not place the slightest reliance on either of these three statements signed by Smith: I utterly discard them as not being worth a moment's consideration. These statements were not written by Smith at all, but were composed by different individuals for, and copied or signed by him: I happen to know where and by whom the precious documents were concocted. One individual connected with their production is honest enough in himself, but I place no faith in the statement he has produced, for the simple reason that he derived his information from Smith. For the present I have done with Smith. Now for a few general observations on the subject of *empyrea*, and the introduction of foreign specimens of that and other species to Brighton. From rumours afloat in this town I was led to suspect that there were foreign specimens of several species then here with a view to their being passed off as British: I im-

mediately commenced a series of inquiries, and became fully convinced the report was founded on fact. I, assisted by my friend Mr. Winter, took the earliest opportunity of cautioning the public; on the 14th of October I announced (see 'Substitute,' No. 1) the capture of *empyrea*, and at the same time stated there were foreign specimens in the town; on the 15th of October Mr. Winter wrote a paragraph to the same effect (see No. 1). Soon after this I became aware of the capture of *empyrea* by other collectors, and, lest my communication in No. 1 should be misunderstood, I wrote, in time for No. 2 (see the date), a statement to that effect; it so happened that this was not published until No. 3 (see p. 27). If any such evidence were needed, this would at once show that I was by no means anxious to suppress information of the doings of other people; on the contrary, I was *the first* to announce the capture of this species by other collectors! The "genius" who wrote Smith's statement in No. 5 was, in all probability, too fast asleep to read this paragraph, or to discover the evident fairness which dictated it. I have now lying before me very many letters from gentlemen of the highest respectability, which prove beyond a question that foreign specimens of *empyrea*, *alniaria* and *erythrocephala* have been brought into this town, and the purpose for which they were introduced is but too evident; nor are these the only species: some very close (and no doubt inconvenient) inquiries are now being made relative to *versicolor*, *rubiginea*, &c., and these inquiries extend to the

season of 1855, as well as to that more recently past. I have sufficient evidence to expose most extensive frauds, but unfortunately it is contained in confidential communications, of which at present I can make no public use. Any sensible man will see that there are great difficulties in the way of clearly proving transactions of this kind, and, after all other difficulties are surmounted, it is no easy matter to induce those who possess the necessary information to stand forth as public executioners and expose themselves to the inevitable bullying. One eminent entomologist writes me as follows:—"As honest men rarely like to incur the ill-will of rogues by exposing them, the rogues, if cunning enough, generally have the best of it, in this world at least." This is true as Gospel! Well, aiming at a public service, I have tried to put a check on the proceedings of certain rogues, and there can be no mistake about the amount of ill-will I have incurred by so doing; for this I care not. But there is another class of people whose anger I have aroused, towards whom I feel differently: quite distinct from the rogues referred to in the above extract may be found a class of people, honest and straightforward in their intentions, but whose ideas and means of information are limited, who are no less angry and spiteful with me than the rogues themselves: these people do not appear to deem it possible that there can be other persons in the world who have greater facilities for acquiring information than themselves: true they only exhibit the narrowness of their own intellects, and make themselves look

very ridiculous, but of course you cannot convince them of it,—as applied to them argument is useless, and they growl and grumble away at the rate of something like forty-donkey power! Never mind, it appears to please them, and it does me no harm. I could explain much more relative to this subject, but refrain: I am aware of certain funny movements, and I also know who “pulls the strings.” Since I first published the statement that foreign insects were here, I have been favoured with very many kind letters on the subject from strangers as well as from old friends: some of the letters, from want of time, have not been answered; I therefore take this opportunity of thanking all those who have so kindly assisted me with information, and I do strongly hope that ere long some of them will raise their courage sufficiently high to enable them to come forward and make a proper use of their information by publicly exposing the nefarious transactions of some of these scamps: depend upon it you will have the honest portion of the public with you, and you need not fear the rest, even though a George Smith be employed to throw dirt at you! (The above allusions to inquiries and extensive frauds relate to other places as well as Brighton.) Whatever may be the amount of abuse levelled at me, in all probability I shall take no further notice of it, so the grumblers and others may indulge themselves in as much as the editor of the ‘Substitute’ thinks proper to print.—H. COOKE, 8, *Pelham Terrace, Brighton*; December 13, 1856.

[We hope the parties upon whom Messrs. Cooke and Winter

have relied for their information that foreign specimens of *P. empyrea*, &c., were to be sold as British ones, will come forward, and prove the case. If they do not, the inference will be against them. The game is in their hands, if they will only make the move,—that is, name the parties.]

Plusia Gamma out in December.—I have to-day bred *Plusia Gamma*: this is the fourth I have had out of chrysalis this week. The larvæ were taken from a bed of mint during September and October, and have ever since been kept in a box in the open air on the north side of a wall, where not a ray of sunshine can reach them. Their late appearance is very curious.—H. COOKE, 6, *Pelham Terrace, Brighton*; December 13, 1856.

A Plea for Insects.—I am haunted by a feeling, which is perhaps no more than a nervous hallucination, that many people take in the ‘Fireside Companion,’ and devour it with fiendish eyes, whose principal object it is to get up crafty plans of more wholesale capture and destruction for the ensuing year. Inspired by that pity for the oppressed which warms the heart of every true Briton, I have come forward, duly commissioned, I assure you, by the whole insect race (the *Arachnidæ* of course excepted), but especially on behalf of the *Lepidoptera*, whose true knight I announce myself in the face of all gainsayers. It is not generally known, at least not by these fierce fanatics of our fraternity, that moths and butterflies are not Amalekites, nor savages, but creatures as cultivated in their ideas,

and as polished in their manners, as any members of the Entomological Club; and it is believed by many who are the best qualified to give an opinion on so abstruse a subject, that their devotion to Science is truly disinterested and sincere, for they have been known, the rarest and fairest of them, to throw themselves unsought into some true entomologist's net, as Curtius did once into that Roman chasm, from the single, and I must say somewhat singular, desire of appearing in the next 'Intelligencer' or 'Substitute.' Anxious, however, as my constituents are to advance the cause of Science by moderate self-sacrifice, they are no less awake than ourselves to the necessity of self-preservation, and of guarding their rights and liberties against Goths and Vandals. The passing year has been one of great excitement to them all: they perceive with pleasure that extraordinary interest which is being felt in them by so many ardent minds; but at the same time, they cannot divest themselves of apprehension that this increase of admiration and renown may be attended with serious personal inconvenience; and it is in consequence of a resolution passed at a meeting of senatorial *Bombyces* in the Metropolitan District, who had for some time been laying their reverend heads together in consultation on this subject, that I have been commissioned to write to you this letter. Their propositions are simple and reasonable, and such, they trust, as all their real friends and admirers will willingly accede to.— I. That a short code of laws be framed for their protection, in a spirit entirely different from the

Game Laws, which entomologists justly abhor, but stringent withal, and especially aimed against three classes of our fraternity — thus tabulated by their worthy secretary *Pygæra Bucephala*, who is partial to big B, and is a complete master of the tables in the 'Manual:— BB. The "boys under fourteen," whom Mr. Stainton does not receive, and who, in the northern part of our island, amuse themselves with bottling *Artaxerxes*. BBBB. The *rabid* collector who snaps at everything right and left, and pinches and pins indiscriminately and insatiably, actuated by no higher pastime than the *amor habendi*. BBBBBBBB. The collector who kills to sell, or (one would think) to eat; for, for what other purpose could a man catch and pin 500 *Cinxia* or 2000 *Corydon*—a monstrous fact which appeared in evidence before the *Bombyces* by two worn specimens of the respective species escaped from the Isle of Wight. Yes, Mr. Editor, I saw them with my own eyes, from three to six on a pin, enough to take a man a short life to relax and set; and all taken last season, probably at the same time that your kind-hearted 'Rambler in the Isle of Wight' was rolling in the clover, or contemplating the beauties of his captured *Cardui*. — II. That they should have their Sunday Bill—in other words, that they should be allowed one day out of seven for worship and recreation, which in their case, are synonymous terms. The evidence before the *Bombyces* on this point was indeed heart-rending, and made their very hair stand on end. It appears that on that day, when every true entomo-

logist is at church with his family, or enjoying with them the quiet beauties of Nature or the delights of home, a horde of unkempt and merciless savages regularly sally forth from London, Manchester and other large towns, and ravage every wood in their neighbourhood; beating, sweeping, smoking, and sugaring, as if their sole object was to rid the world of the delicate creatures they profess to admire. Now, surely, Mr. Editor, such men are a reproach to Science. I always thought that the study of Natural History was a humanizing, Christianizing study, directly tending to make men peaceful and pious. Who does not see this in White of Selborne? How holy, and genial, and benevolent, was his tone of mind! How different was he from the excited, restless, godless fellows, who now turn an innocent recreation into a consuming passion, to the indulgence of which man's highest duties are mostly sacrificed! It is true a man must have recreation: but must he not also have religion? Even Lord Palmerston would allow this; and if the two are incompatible, which must be sacrificed, religion or recreation? But I maintain that they *are* compatible, and that where there is a will there is a way even for the working man to have both—to worship God and to catch butterflies. But I am getting rather long and rather warm too; however, I believe I have said my say, and commend these two propositions to the consideration of your readers.—E. HORTON, *Wick, Worcester*; December 18, 1856.

[We are not going to open our

pages to arguments on this Sunday question, but we like the tone of our correspondent's remarks, and give them as the expression of his opinion. But we should like to know what good would come if the men alluded to were debarred from collecting on the Sunday? They would probably spend the time in idleness, in drinking or worse. They will not go to church; they have no sympathy with it, nor will they have so long as the church shows so little sympathy with them. All history shows it is vexatious and dangerous to interfere with men's recreations. Men are not to be made good by force; and they had better, we think, be allowed to go to the woods and fields than left to the temptations of the town and public-house.]

What's his Name?—On placing *Grammophora diptheroides* in my cabinet the other day, I noticed that the name is wrongly spelt at pages 5294 of the 'Zoologist,' and 83 of the 'Substitute.' In both places it stands *diptheroides*. Guenée and Stainton have it *dipthera*, which I suppose is right. In Doubleday's list it is spelt *diphthera*. Perhaps our learned friend "*Proh Pudor*" will be so kind as to inform us which is the proper mode of spelling it.—N. COOKE, 6, *Wentworth Street, Everton, Liverpool*.

The Packing of Specimens to Correspondents.—In the last number of 'The Substitute' are some remarks on packing specimens to correspondents. Allow me to add a word on the packing Coleoptera. Though these latter are not liable to breaking in two like a corpulent moth, they are by no

means proof against injury if the box gets crushed in the post, or a pin comes out; the former accident is best guarded against by using a box sufficiently strong to resist the efforts of the post-office stampers, who I fancy are selected for their muscular strength, and enveloping the same (the box, not the stampers) in cotton wadding, which adds little or nothing to the weight. The other casualty is avoided by fixing the pins well in, using cross pins with heavy insects, and by putting a lump of cotton on the top of all, which will arrest the movements of any stray insect which might, after all, break loose, and prevent its doing injury to itself or comrades. —GEORGE GUYON.

Acherontia Atropos.—In the last 'Substitute' Mr. Morris has stated his opinion of there being some puzzle in the short period assigned to *Acherontia Atropos* for its final transformation. If the following facts are of any use they are at your disposal. I had three larvæ of *Atropos* last year nearly full grown; one entered the earth on the 14th of September, another on the 27th, and the third on the 2nd of October, 1855. Their cage was kept within the house until one emerged from its pupa state on the 28th of September, 1856, quite perfect, and another on the 30th of September, 1856, with crippled wings. At the end of October I found the third pupa was dead. I had one larva this autumn brought to me two inches long on the 27th of September; it fed on potato leaves, and at the end of nine days had attained the length of $4\frac{1}{2}$ inches; it then ceased to feed, and became black

in three days, when it died. By this it appears the larva existence is very brief, and the pupa of considerable duration. — WILLIAM BUCKLER, *Lumley Cottage, Emsworth*; December 18, 1856.

OBITUARY.

We regret to have to announce the death of two entomologists, who, but six weeks ago, acceded to the wish of the editor of the 'Entomologist's Annual' in allowing their names to appear in the Supplemental List of British Entomologists: we allude to Mr. Thomas Fathers, of Witney (who contributed two notices to the 'Intelligencer' under the signature of T. F.) and G. S. Heales, Esq., of Doctors Commons, who, though comparatively an idler in these busy times for entomologists, was well known to the frequenters of the Annual *Réunions* of the Entomological Club, at Birch Wood, for his agreeable *bonhomie*.

Now ready, price 6d., No. 4 of

ELEMENTS OF ENTOMOLOGY: an Outline of the Natural History and Classification of British Insects.

By W. S. DALLAS, F.L.S.

John Van Voorst, 1, Paternoster Row.

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, January 3, 1857.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 12.]

SATURDAY, JANUARY 10, 1857.

[PRICE 2d.]

THE NEGLECTED ORDERS.

To resume where we left off last week. We would recommend to any fishermen who may take in hand to work out the British species of the *Phryganidæ* and their allies, the great work of Pictet, 'Recherches pour servir à l'Histoire et à l'Anatomie des Phryganides,' and the memoirs of the same author published in the 'Mémoires de la Société d'Histoire Naturelle de Genève,' Tome VII. If these works be taken as the ground-work of their investigations, they may find that all, or the greater part of our native species, are there described, and their natural history set forth; and if it should prove otherwise, the study of them will make their labours easy and more pleasant. In a new country it is always an advantage to have as a guide one who knows something of it and the manners of the inhabitants.

We had written so far when the appeal on behalf of the Hemiptera by Mr. B. Cooke (ante p. 77) came to hand. It corroborates exactly

what we have said, that the great want in this country for those who would investigate any fresh Order of insects is a guide book. As regards the *Hemiptera*, some years have now elapsed since a volume of descriptions of the British species was undertaken by Mr. Dallas, as one of the series of the 'Insecta Britannica,' but we hear nothing about it being in preparation, although the other promised volumes of the 'Insecta Britannica' have been published. We think the committee, under whose superintendence these works have been produced, must feel that while any part of the series originally promised, and for which series subscribers' names were obtained, remains in abeyance, they have not kept faith with their subscribers. We have every reason, from the well-known intimate acquaintance of Mr. Dallas with the *Hemiptera* and *Homoptera*, to believe that it is from no want of ability on his part that the work is delayed, and we presume that there can be no want of material, or Mr. Dallas would not have undertaken the work. We think,

therefore, that the subscribers and the public have a right to expect some explanation of the delay in the appearance of the volume in question; and if, from any cause, Mr. Dallas is unable or unwilling to fulfil his engagement with the Committee, that they should put the work into other hands.

With regard to the *Coleoptera*, we believe that there are plenty of able men in this country that could among them produce a "Manual" of that Order. Stephens's has become, to a great extent, obsolete; partly because so many varieties are described as species, partly because species are misquoted, partly because the descriptions themselves are inefficient, and partly because the classification is not in accordance with the advanced ideas of the time. We mean no disrespect to Mr. Stephens by these remarks: when we think of the immense number of species of *all Orders* that he described, his labours seem wonderful; indeed, it is the extent of the field in which he worked that is mainly the source of the imperfection now felt. We should like to know how a Manual of British *Coleoptera* issued in parts, at a low price, would be likely to be received and supported. The cost would be great, too great for any individual to risk without reasonable prospect of its being

met by the entomologists of Britain; but if the project should be properly entertained we would endeavour to induce those who could do the work to do it. Then, with such a work as this in their hands, the entomologists of Britain might not only make themselves acquainted with the species of *Coleoptera* already known to be in the country, but might, nay must, discover new ones; and further, be able to add to the knowledge of the natural history of the Order which offers such a wide and little-explored field of research. The labours of the continental entomologists in this respect contrast very favourably with those of the English, and it is time we were up and doing.

The 'Annual' of this year has supplied one of our wants by a Synopsis of the Dragon-flies: this is a good instalment.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & Co., PATERNOSTER ROW, as well as of the Publisher.

Several communications only wait for room.

J. WOODS.—Declined with thanks.

H. H. MERRIMAN.—The insects are too common to deserve particular notice.

H. DORVILLE.—Letter received and forwarded to the party mentioned.

DUPLICATES AND DESIDERATA.

Pionea Stramentalis.—I have a considerable number of *Pionea Stramentalis* in duplicate to exchange for any species not indigenous to this county.—EDWARD SMITH, Turkey Street, Worcester.

COMMUNICATIONS.

Fungus on Pupæ.—Will any of your correspondents oblige me by informing me of some method of preventing pupæ from being attacked by a kind of Fungus which destroys them?—F. B. W. WHITE, 2, Athole Place, Perth; December 19, 1856.

The Sugar Bait.—I hope you

will pardon my troubling you, but as I am a very old entomologist, born before sugaring was known, and as I am again taking up my favourite amusement, I shall feel obliged by your giving me the plain and simple way of making this very enticing syrup. I find in Mr. Shield's work on 'Moths and Butterflies' a recipe for it, but I do not understand what some of the ingredients are intended for. He begins by recommending the following "Sugar." Now I can find no sugar mentioned in the body of his recipe, and I find a something called "Foots." May I request the favour of your telling me what it is, and where to be obtained?—T. W. EDWARDS, Bilsington, Ashford, Kent; December 22, 1856.

["Foots" is the name for the sugar that is saturated with molasses which drains downwards in the casks in which sugar is imported from the West Indies. The recipe of Mr. Shield is good, but we have found the mixture efficacious without the honey and essential oil of almonds.]

A Revival.—As I have not appeared for many years among my brother entomologists I have no doubt many think I am dead, and I am afraid many of them are gone before me, but I can assure you that there is not one of your friends more devoted to the Science than I am, and very few have spent so much money in following it. I am an old friend of the late Mr. Haworth; and Mr. George Waterhouse, although much my junior, was the first that called my attention to the British insects: he was with me when I discovered the genus *Phlœobius*

Edwardsii of Stephens, and was the first that pointed it out as a new genus. I find that I have now to find out nearly a hundred new species that are quite strangers to me. If there is any thing to be found in this neighbourhood that you can point out, either in the *Coleoptera* or *Lepidoptera*, I shall be obliged.—*Id.*

Structure and Habit.—I venture to differ with the author of the leading article in the 'Substitute' of December 20th. I hardly think that the expression of M. Guenée will strictly bear the interpretation there put upon it. The words in the original text are, "Les chenilles de la seconde série, ou Nonagrides, ont des mœurs particulières qui entraînent des modifications dans leur organisation."—Vol. v. p. 65. The word *entraînent*, if translated literally, would signify "drag with them," or "bring with them" modifications in their organization,—certainly not "necessitate." The clear meaning, however, of the passage, which cannot perhaps be translated literally into English, is that "the peculiar habits of the Nonagridæ require modification in their organization." Even the translation, as you have given it, will not bear the construction you intimate in the subsequent remarks: to bear out this supposed meaning of M. Guenée, the word "necessitate" ought to be "cause" or "produce," for it is quite clear that if the manners or habits of the caterpillars *necessitate* modifications in their organization, the design of the organs was simultaneous with the manners or habits; in other words, the passage may be fairly read, "The

habits of the larvæ of the *Nonagridæ*, differing from those of the rest of the family *Leucanidæ*, require that they should be provided with an organization modified to suit their different mode of living."—C. R. BREE, *Stricklands, Stowmarket*; December 24, 1856.

[We had not the original, but only the translation (by another hand), before us when we wrote the article in question. We are glad there was a *lapsus calami*, and thankful it has been pointed out. Independently of the quotation, however, we think our views are sound, and the article may do good in inducing some persons to think about the subject who never thought about it before.]

Aporia Cratægi.—Through the liberality of my friends I possess a sufficient number of *Aporia Cratægi*, having taken only one myself. One fine July morning I tried Mr. Stainton's recipe, an early walk, and reached Knock Wood not long after the sun had risen (he is no sluggard at that time of year). While preparing my net for work a beautiful *Cratægi* floated gracefully down from its airy height, and alighted on the bloom of a tall thistle, not two yards from where I was standing; the beauty was speedily transferred to my collecting-box. I have never taken another, nor has one been seen, to my knowledge, in this immediate neighbourhood. The species appears to be very local, as my friends inform me that it is abundant in some parts of Kent, not far from Tenterden. What is the cause of this *fastidiousness*, as it seems to us? the food-plants of its larva are surely common enough. How little we know about

the larvæ of many of the *Rhopalocera*! Some, indeed, are too easily found, as the genus *Pieris*, with the exception of the gem *Daplidice*. The larva of *Gonepteryx Rhamni* is not often detected by the casual observer. How beautiful it looks, resting motionless, a semi-pellucid emerald, pendant from a leaf of the delicate *Rhamnus Frangula*! and then to see the quaint crysalis! one wonders why the smooth larva has so distorted itself, until the appearance of the angle-winged imago solves the mystery.—S. C. TRESS BEALE, *Ivy Court, Ten-terden*.

Cynthia Cardui.—What is the cause of the uncertain appearance of *Cynthia Cardui*? I shall never forget the day when I saw quite a cloud of them, flying about blooming thistles which grew in a gorse plantation. That was a long time ago, when I used *spits* instead of pins, as my specimens, preserved to this day, sadly testify. I have not seen a living *Cardui* since.—Id.

Vanessa polychloros.—Of the larvæ of *Vanessa polychloros* I can generally make sure. We have only one small elm in our garden (though a weed in some localities, the tree is a rarity with us), and that elm is sure to produce a good crop of *polychloros* larvæ in June, much to the chagrin of our gardener: they rather astonish him, for perhaps the luxuriance of the tree's foliage is apparently uninjured on the one evening, and on the next the boughs are almost stripped of leaves, and alive with spiny caterpillars. When they commence feeding, they do so in right earnest, for unless their ra-

vages are speedily stopped not a leaf will be left on the tree.—Id.

Melitæa Athalia.—I cannot find the larvæ of *Melitæa Athalia*; after carefully searching the food-plants in the locality most frequented by the imago, last summer, I was totally unsuccessful. If in this neighbourhood next May, I purpose "trying again." "Nil desperandum" should be the motto of every entomologist.—Id.

Cerambyx Heros.—In reply to Mr. W. Chaney (p. 76), I beg to inform him I captured one of these beetles in H.M. Dockyard, Deptford, on a log of Italian oak, five years ago, and have it now in my possession.—W. H. BRETT, *Deptford*; December 22, 1856.

On Duplicates and Desiderata.—Although I do not by any means wish to enter into a paper war with a person who so far forgets himself, in his first letter, as to intimate that an unknown correspondent was "no gentleman," yet I think that the terms he makes use of deserve a comment or two. It is a generally accepted theory that the conduct of the many give the tone to public opinion, and from the various pages of the 'Intelligencer' and the 'Substitute' we may glean so many instances of the absence of that desire to oblige their fellow-labourers which *should* characterize all the knights of the net, that I imagine I can with justice re-echo your correspondent's words, and exclaim that it is *his* expressions that are "unjustifiable and unwarrantable." Again, he appears to think it wrong to request those who give notice of duplicates to state what return they expect (for that was the object of my letter, p. 78), and

yet, in his own epistle, he complies with the suggestion; surely nothing can be more inconsistent than this, as he first complains of, and then agrees with, my epistle. "I have," says he, "carefully looked over the pages of the 'Substitute,' and, with one exception, I observe no offer of insects unless accompanied with a more or less direct intimation that a return is expected." Now an indirect intimation is no use at all, and even if it were, had Mr. Greene extended his search to the 'Intelligencer,' he would there have found numerous notices in which there was not the slightest allusion to a return being required. During a hasty glance which I took over its leaves I found several, and I have no doubt that had I time to make a more careful survey I should find many more. I am perfectly well aware that no entomologist has a right to the insects of another, but I fancy that such a feeling of brotherhood should prevail amongst us as to induce us to make a sacrifice of some little trouble to the wants of fellow-collectors. To put a case in point, suppose that the gentlemen referred to in your correspondent's letter, *viz.*, Messrs. Stainton and Doubleday, had refused him any information; would he not have thought it very hard had they replied, "It has taken us a very long time to elucidate these matters, and why therefore should we impart them to you? Why should we study for years, and spend many anxious hours in solving knotty points and determining doubtful questions, and then give a full explanation (which it has cost us so much to prepare) to

you, who have had no trouble in the matter?" But his own epistle shows that they did not do this; they gave him every help they could, and as they are but two members of a noble band who are always ready to do the same, I must say that those gentlemen who are indebted to the luminaries of the Science should consider it as a debt to be repaid in kind to those of their fellows who may be in want of it. What would become of our pursuit were the world at large to know that the selfish doctrine of "No duplicates no desiderata" reigned paramount amongst us? Why we should fall at once from the sublime to the business-like, and our free intercourse with Nature in all her loveliness (which her votaries enjoy in an unparalled degree) would have no more effect on us than it has on our nets, for we should be calculating, as we capture each successive insect, what would be its value in the entomological market. Would this be no disgrace to us? With this question I shall conclude (not having any particular desire to admire my name in print), by again signing myself—ONE OF THE SUFFERERS; Dec. 23, 1856.

Death of Pupæ.—Of five pupæ of *Acherontia Atropos* that I have obtained this year two have died: is it from want of moisture, or from being Ichneumonized? Why do Elephant larvæ, after having spun, instead of changing to a chrysalis, shrivel up and die? I have lost seven this season in that manner.—C. A. A.

[Possibly the pupæ died because they were kept too dry. We should like to hear some opinions on the matter.]

NEW BOOKS.

DALLAS'S 'ELEMENTS OF ENTOMOLOGY.'

We continue the extracts we commenced at p. 70.

WATER BEETLES.

"One of the largest, most formidable and most abundant of the British species of this group, is the *Dyticus marginalis*, or Margined Water Beetle, specimens of which may be obtained in almost any piece of water. This insect measures from an inch to an inch and a quarter in length, and is of a broad oval form; the whole upper surface is blackish olive, except the margins of the prothorax, and the outer margins of the elytra, which are of a dull yellow colour, as is also the lower surface of the body. The whole structure of this insect is admirably adapted to its aquatic residence; its thorax is as wide at the base as the elytra, so that its form is a complete oval; its body is thickest in front, and there is not a projection of any kind from its surface to impede its motion through the water. The hind legs form a pair of long, broad and powerful paddles, the surface of which is increased by a fringe of stiff hairs running down the inner margin of the flattened tarsi, and by the action of these the *Dyticus* is enabled to swim through the water at a rapid rate. But although thus fitted for an aquatic life, the beetle is nevertheless under the necessity of rising frequently to the surface for a supply of air, and this operation is effected in a very simple fashion. It is to be borne in mind that the body of the

insect is considerably lighter than water, and that he only keeps himself below the surface by the rowing action of his powerful limbs. Accordingly, when he finds it necessary to breathe, he simply suspends the working of his paddles, when his body gradually rises to the surface, but as the fore part of it is thicker and heavier than the rest, it naturally remains immersed in the water, when his tail is exposed to the air. This is the very arrangement he requires, for his respiration being effected through a pair of stigmata, which are concealed beneath the elytra at the extremity of the abdomen, he has nothing to do after rising to the surface but to raise his elytra a little, take in his fresh cargo of air, and then go off about his business. This consists, for the most part, in the pursuit and slaughter of all his weaker neighbours, which he seizes remorselessly with his fore-feet, and conveys to his mouth with great relish. Anacreon has written one or two odes on the supposed happiness of the *Cicadæ*, which, if we may judge from the noise made by that insect, must be very great indeed. However, on a careful comparison of the circumstances of the two insects, I can't help thinking that the balance of comfort, at any rate, must be in favour of our friend the water beetle. There he is this awfully hot day, when we, who have walked out to look at him, are in a most miserable state of perspiration,—there he is enjoying the luxury of a cool bath, with every necessary of his existence within easy reach,—his food to be had without any more exertion than just what has been recommended by the wisest men in all ages, to

make it taste the sweeter,—a plunge down into the deep water, snapping up a larva here, a small beetle there, with a little crustacean or two between, or perhaps occasionally dropping down upon a struggling tadpole or young stickleback that has strayed rather too soon from under the paternal eye, his own bulk and strong armour rendering him all the while perfectly indifferent as to the view the other inhabitants of his little world may take of his proceedings. And to make sure of the continuance of this state of felicity, to avoid all chance of our friend finding himself some fine morning floundering about in the mud, with a disagreeably hot sun aggravating the necessary hardship of his being deprived of his bath, Nature has kindly provided him with a pair of ample wings, upon which he can start off at any time to seek his fortune in another place. He generally selects the night for these migrations, and is indeed exceedingly partial to nocturnal excursions in the regions of the air, though for what particular purpose it is impossible to say, unless, as we often observe to be the case in a higher animal, the great ease of his circumstances begets a habit of raking. Certain it is that our friend the *Dyticus* is a most inveterate rake, and his fondness for nocturnal expeditions frequently brings him into trouble; he appears to have an insuperable objection to being seen on the wing, and therefore, as soon as the day begins to break, plunges into the first water he sees, a practice which readily accounts for his being often found in water-butts, or even in

the still more ignominious durance of a puddle. Occasionally also he has been known to mistake the glass of a green-house for water, and by dashing heedless down upon it commit an involuntary suicide.

“The larva of *Dyticus* is as voracious as the perfect insect, but here all resemblance between them ceases. The beetle, as may be gathered from the description given above, is a stout, portly-looking insect, the moderate convexity of his back reminding one of the gentle swell observable in the waistcoat of a well-to-do middle-aged gentleman who has discovered the *summum bonum* of human existence to consist in a good dinner; but the larva, although his actions would seem to indicate his adoption of this view of affairs, certainly does very little credit to his good living. On the contrary, he is a slender, wriggling worm, with a most villanously hungry aspect, thickest about the middle, and tapering off nearly to a point at the tail, and his head is armed with a pair of long sickle-shaped jaws of a most formidable appearance. The upper surface of the segments, especially the anterior ones, is horny; the three first segments of the body are furnished with jointed legs; and the general colour of the creature is a pale dingy brown. The structure of the mandibles is peculiar; they are acute and hollow, and exhibit a small slit close to the tip. The larva, on capturing his prey, which consists principally of other aquatic larvæ, buries his formidable jaws in their bodies, and thus sucks out their juices with very little trouble.”—pp. 75—78.

THE ENTOMOLOGIST'S ANNUAL
FOR 1857. Van Voorst.

The contents of this volume are enumerated in the advertisement on p. 144. The papers we especially like are 'A Synopsis of the British Dragon Flies,' by Dr. Hagen; 'Observations on the Myrmecophilous Coleoptera or Ants-nest Beetles of Britain,' by E. W. Janson; and 'How Insects Breathe,' by John Lubbock, F.G.S. Dr. Hagen is acknowledged in Germany to be a master in his knowledge of the *Neuroptera*, and this admirable paper will supply a blank in our British entomological literature, and no doubt advance the claims of the dragon flies to be noticed. Mr. Janson's paper is full of matter which will be new to the bulk of English Coleopterists, and will direct attention to a very curious and interesting phase in insect economy. Mr. Lubbock's paper is a laudable endeavour to call attention to physiological Entomology, which is so much neglected in this country: it is written with an evident desire to accomplish this object, and exhibits an admirable conscientiousness in the author. The other papers are all good: the 'Supplementary List of British Entomologists' will astonish a good many by the number of names unknown to fame, and is a pleasing evidence of the numerical increase of collectors of insects. The plate is engraved on steel, and is unusually good, and we observe it is by Mr. E. W. Robinson, a new entomological artist. Altogether this is the best 'Annual' that has appeared, and the issue of the three editions, each at a different price,

will, we hope, induce entomologists of every grade to possess themselves of this record of the progress of their Science in Britain. Δ

EXTRACTS.

NOTES ON NOCTUÆ: FROM
GUENEE'S NOCTUELITES.

[Continued from p. 120.]

Mamestra.

The genus *Mamestra*, as Ochsenheimer had created it, could not subsist, because it contained many species which do not differ from ordinary *Hadenæ*. I have therefore employed this name for the present genus, which besides contains several of the *Mamestræ* of the German authors. I have divided it into four groups: the first comprises species of rather large size, of which the abdomen is slightly crested, and which principally inhabit mountainous countries. The second group comprises insects with rounded wings, in which the reniform stigma is marked externally with one or several pale dots; the abdomen is not more crested than in the preceding group. In the third the abdomen is strongly crested in both sexes, and the reniform stigma entirely or almost entirely pale; the lines begin to be more distinct. The larvæ are better known than those of the preceding group. In the fourth group the abdomen is strongly crested, the wings are dentate, and the posterior marked with a dark border (this fourth group consists only of species from

New Holland). The larvæ of *Mamestra* are a little less vermiform than those of the rest of the family: their spots do not form well-developed shining warts, and their colours are generally not so dull; the greater part also live generally less concealed; several species are known as destructive, especially *Brassicæ*, which does not confine its ravages to our cabbages, but shares with *Triphaena pronuba* a part of our kitchen-garden plants. Its injuries are very perceptible to our gardeners, because continued during a portion of the winter, and at a time when vegetable life becomes precious. In order to get rid of the larvæ, remedies have been recommended worse than the evil, and besides hardly practicable, such as powdering the plants with lime, or washing them with liquid prepared with soot or tobacco, &c. Independently of the expense and considerable amount of manual labour which the use of these remedies would require, besides the injury to the plants themselves and affecting their flavour, they have not even the merit of attaining their object, for certain parts of the plant always remain untouched, and the caterpillars are always skilful enough to select such; besides even the parts thus operated upon do not always repel the attacks of the larvæ: and even if we did succeed in driving them away, they would spread over the neighbouring plants, for, as I have just said, they are polyphagous, and one cannot, in fact, doctor an entire garden.

On the other hand, these caterpillars do not live in society, even when they are young, and do not

testify their presence by webs or agglomerations of leaves; so that to get rid of them one is obliged to kill those we meet with, one by one and day by day, that is to say, only the half of those which exist, for a great number easily succeed in escaping the most continuous research.

Hence it results that the destruction of the *Mamestræ* is almost impossible, and, except in those cases where their ravages are almost alarming, and justify the employment of a special manipulation, we are obliged to have recourse for their extermination to enemies more patient than ourselves, especially to Nature, which suddenly arrests their multiplication by atmospheric influences or by other means which we cannot explain.

In the perfect state the *Mamestræ*, in their manners, do not differ from the general run of *Noctuæ*. Their exterior organization presents nothing particular; their colours are generally rather insignificant, although their markings are neatly expressed.—Vol. I. pp. 188, 189.

Apamea.

This is a genus which, though adopted by all authors, has yet been considerably varied as to the species it should contain. In my 'Index' I restricted it considerably, and I still maintain it so, only adding *basilinea* and *connexa*, which experience has proved to me to be true *Apameæ*.

The larvæ of these insects have many points of relation with those of *Xylophasia* or *Luperina*. They are short, stiff, with the skin thick and shining, with the horny plates well developed, and generally of

gray or dull colours. They live principally upon the *Gramineæ* or allied families, of which they eat the lower leaves or roots. They carefully conceal themselves during the day, and even retire into the stubble or cut stems, which has led to the belief that some of them were endophagous, but it is certain that, as in the case of some of the *Leucaniæ*, they merely seek a shelter there, and do not eat the inner substance. Besides, they never change to a chrysalis in the stem, and never construct private openings.

The larva of *basilinea* specially attacks our cereals, and sometimes multiplies so as to occasion real havoc. The larva is developed in the ear of the wheat, and passes there all its youth and even a part of its adult age: it is hatched in little families on a single ear, and the young larvæ pierce the grains to feed on the farina, which at that period already commences to solidify. I have before me several ears thus attacked, of which all the substance has been eaten, although the covering of the grain and "les balles" have remained untouched, excepting the little opening which has served to empty them. When the larva is too large to be contained in the grain, it thrusts itself between "les balles" or the beards of the ear, and is then with difficulty distinguished, for it is nearly of the same colour. Now comes the period of harvest: the larva is then collected in the sheaf, and if we examine the floor of a barn at thrashing-time, we see the larvæ, driven from their retreat by the blows, walking about by the dozen. The time, however, is come when their power of doing mischief is

over: the grains become hard, and the cold of winter soon benumbs the larvæ, which shelter themselves in summarily constructed cocoons, in order to pass the winter. As soon as spring arrives they change their manner of living, and only attack roots or the lowermost leaves: they then increase in size, though very slowly, and it is only then that they assume the livery of *Apameæ*, for previously one would take them for *Leucaniæ* or young *Dianthaciæ*, so true it is that the habits of the larvæ exercise a powerful influence on their forms and colours. In the month of March they bury themselves in the earth to change to chrysalides. I have dwelt at some length upon the history of *Apamea basilinea*, which, in the larva state, is little known, and which must, as we see, be counted amongst the number of enemies to our cereals.

The perfect insects of this genus are of moderate size, dull colours and with tolerably sharp markings: the stigmata are very distinct, often white or yellow, and the terminal space behind the subterminal line, which is always more or less evident, forms a dark patch, often divided into two dark spots. These *Noctuæ* are particularly lively, and they fly at dusk with great ardour. —Vol. I. pp. 204, 205.

[To be continued.]

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London: John Van Voorst, 1, Paternoster Row.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAIRTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, January 10, 1857.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 13.]

SATURDAY, JANUARY 17, 1857.

[PRICE 2d.]

MERE COLLECTORS.

THE term "collectors" has been applied rather invidiously to those persons who make a collection of insects for their amusement and take no interest in the Science of Entomology. Doubtless it is to be wished that the collections were made subservient to a scientific purpose, yet we think there is much to be said for the mere collector. Man is an accumulating animal; he has an instinct for gathering objects together without much reference to their utility, and it is surely better that this impulse should take the direction of collecting an assemblage of insects—the most beautiful and wonderful of the works of Nature—rather than one of snuff-boxes, pottery, or any more worthless forms on which man has exercised his artistic skill, and which the fancy of individuals has from time to time led them to amass. Not that we would say one word against any collection of objects which can illustrate the history of man, or even his whims and

follies, but we hold that, viewed merely as articles of curiosity, no results of man's ingenuity, however wonderful in themselves, can for a moment be compared with the lowest of the productions of Nature's *atelier*. There are also many incidental advantages attending the formation of a cabinet of insects by one who takes the living specimens. He is of necessity abroad in the open air, and is brought into immediate contact with all the lights and shades of still and animated Nature, in addition to the special objects of his pursuit. All of them, perfect in their kind and linked together by the most admirable relationships, make up a picture which the mind never ceases to contemplate and revert to with delight. "The poetry of earth is never dead:"—it may not affect all men alike, because all have not "the feeling and the faculty divine" in equal measure, but no one is entirely destitute of the power of appreciating beauty, and the entomologist is always in possession of the conditions favourable for its cultivation within him. We do not

wish to overrate the influence of outward nature, but there can be no doubt that he who has his heart constantly appealed to by the magic beauty of Nature's gems is a better man than he who is not under such appeals, or than he himself would be if removed from them,—at the very least he is out of the way of temptation from his fellow men. That is the position of the entomologist, though he be no more than a collector, and it is his duty to improve it; the very fact of his being a collector is itself a most assuring sign of the capabilities of the man. Would it not be better for our aristocratic youths if they had a knowledge of the insects of their native country; for the middle class young men if they were aware of the entomological inhabitants of their locality, or for the toil-worn artisan, if the formation of a collection of insects were a sufficient inducement for him to leave the present jovial and debasing excitements of his leisure? Assuredly it would: every man requires a relief from his daily employment, and a vast number who now seek it in vicious indulgences might find it in the quiet and harmless excitement of Entomology.

There is a positive good then in being a mere collector: it is, moreover, a step towards scientific

knowledge, and it is not to be doubted but that some collectors will take a step further. The difficulties are more apparent than real; to some they would be pleasures. The investigation of structure and function, their relationships and adaptations to circumstances, offers such a boundless field of enquiry that we are satisfied many minds only require to be introduced to the subject to pursue it with avidity. On the other hand, those who from any cause cannot rise above the rank of collectors might become observers, and add to the knowledge of the economy of the creatures they collect, and they can scarcely work out the history of any insect without finding something not noted before.

The friends of the late Mr. David Dyson, of Manchester, have proposed a subscription to procure lithograph copies of his portrait. They will be executed by a French artist in the first style of the art, and the price will be 5s. each; framed 10s.

Those persons who felt an interest in the man and his endeavours in the cause of Science, may now assist in the attempt making to preserve a memento of this enthusiastic Naturalist. Subscriptions received by Mr. J. A. Wasse, 23, Upper Brook Street, Manchester.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

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Several communications only wait for room.

H. H. M.—Declined.

H. A.—Declined.

G. W. R.—Declined.

E. B.—Declined.

J. L. E. SMITH.—Under consideration.

DUPLICATES AND DESIDERATA.

Lepidoptera wanted.

Acronycta Myricæ,

„ Aceris,

„ Salicis,

Stilbia anomalata,
Caradrina Morpheus,

„ blanda,

Leucania turca,

„ muscosa,

Apamea ophiogramma,

Luperina Cespitis,

„ Dumerilii,

„ abjecta,

Xylophasia Scolopacina,

Triphæna subsequa,

„ orbona,

Noctua leucographa,

„ ditrapezium,

Agrotis saucia,

„ lunigera,

„ obelisca,

„ cinerea,

Heliofobus hispida,

Tæniocampa Populeti,

„ miniosa,

Orthosia neglecta,

Tethea retusa,

„ subtusa,

Cosmia diffinis,

Euperia fulvago,

Xanthia gilvago,

„ aurago.

Duplicates.

Spælotis cataleuca,

Agrotis corticea,

„ Tritici,

„ valligera,

„ puta,

„ putris,

Tæniocampa rubricosa,

„ munda,

Anthocelis litura,

Xanthia rufina,

„ flavago,

Dianthæcia conspersa,

Eremobia ochroleuca,

Polia dysodea,

„ serena,

Epunda lichenea,

Hadena contigua,

„ Atriplicis,

Aplecta herbida,
 Thyatira batis,
 „ derasa,
 Calocampa vetusta,
 Cucullia Asteris,
 Plusia Orichalcea, rather
 wasted.

[To be continued.]

—H. J. HARDING, 1, *York Street,*
Church Street, Shoreditch.

I have a number of good specimens of the following insects, all of which I have taken or bred this last season.

Papilio Machaon,
 Gonepteryx Rhamni,
 Aporia Cratægi,
 Limenitis Sibylla,
 Hipparchia Hyperanthus,
 Vanessa Atalanta,
 „ polychloros,
 Cynthia Cardui,
 Grapta C-Album,
 Argynnis Paphia,
 „ Adippe,
 „ Aglaia,
 „ Euprosyne,
 Melitæa Artemis,
 „ Athalia,
 Thecla Quercus,
 Polyommatus Argiolus,
 „ Corydon,
 Pamphila sylvanus,
 „ linea.

I should be very glad to send any or all of these to any kind collector that would assist me with any of the following northern species.

Erebia Blandina,
 „ Cassiope,
 Cænonympha Davus,
 Polyommatus Artaxerxes.

—GEORGE H. GOODWIN, 26,
Shannon Terrace, Broke Road,
Queen's Road, Dalston.

Lepidoptera.—I have duplicates

of the following if any one should chance to be in want of them.

Thecla Rubi,
 Argynnis Selene,
 „ Euprosyne,
 „ Aglaia,
 „ Adippe,
 Nemeophila Plantaginis,
 Lasiocampa Rubi,
 Saturnia Pavonia-minor,
 Plusia chrysitis,
 Brephos Parthenias,
 Cloanthe Solidaginis.

I should be glad of any of the less common butterflies, except

P. Corydon and
 P. Adonis.

—W. A. BONNEY, *Churchdale House, Rugeley.*

I have about 170 small beetles upon card, and about a dozen upon cork, forming about 40 different species, which I should be glad to exchange for a few Lepidoptera.—G. W. REEVE, *Weeford School, near Lichfield; January 17, 1857.*

Lepidoptera.—In examining the list of Lepidoptera described in the 'Manual of British Butterflies and Moths,' I have remarked how many species you have which we have not the good fortune to find in Belgium, and also how many species which are called rare or local which are common with us. I have, therefore, thought it might be advantageous to both parties if any English collector would agree to make an exchange of duplicates with me. My list contains only the names of the species hitherto described in the 'Manual,' for I am not aware what other species are found in England. I beg, therefore, that any collector who may reply to my offer will give

me a general list of his *Desiderata*.

Duplicates.

Papilio Machaon,
Gonepteryx Rhamni,
Colias Hyale,
Pieris Cratægi,
Leucophasia Sinapis,
Limenitis Sybilla,
Apatura Iris,
Vanessa C-Album,
Argynnis Lathonia,
" Valezina,
Melitæa Athalia,
" Artemis,
Polyommatus Acis,
Thecla Lynceus,
Polyommatus Xanthe,
Procris Statices,
Anthrocera Trifolii,
Sphinx Pinastri,
Smerinthus Tiliæ,
Satyrus Hero,
Hesperia lineola,
Syntomis Phegea,
Aglia Tau,
Heterogenea asellus,
" testudo,
Clostera Curtula,
" Anachoreta,
Cerura erminea,
Bryophila Algæ,
Diphthera Orion,
Acronycta auricoma,
Pachetra leucophæa,
Caradrina alsines,
Lithosia mesomella,
" griseola,
" helveola,
" aureola,
Setina irrorella,
Bombyx Populi,
Demas Coryli,
Psilura Monacha,
Porthesia chrysorrhea,
Hypogymna dispar,
Ennomos alniaria,

Aplecta herbida.

The specimens are quite recent and in perfect condition.

Desiderata.

Lycæna Alsus,
Sesia Bembeciformis,
Hepialus velleda,
" Humuli,
Lithosia complanula,
Nudaria mundana,
" senex,
Pœcilocampa lanestris,
Cilix spinula,
Platypteryx hamula,
Cymatophora diluta,
Acronycta Menyanthidis,
Leucania comina,
" Typhæ,
" obsoleta,
" conigera,
Nonagria fulva,
Hydræcia nictitans,
" micacea,
Xylophasia hepatica,
Heliophobus Popularis,
Charæas Graminis,
Cerigo Cytherea,
Apamea basilinea,
" gemina,
" unanims,
Agrotis suffusa,
" corticea,
" nigricans,
" Tritici,
" puta,
Triphæna interjecta,
Noctua bella,
Tæniocampa rubricosa,
" cruda,
" munda,
Lithomia Solidaginis,
Orthosia opima,
Anthocelis lunosa.

All the species of the genera *Leucania* and *Nonagria* are wanting in Belgium, except *L. pallens*, *impura*, *lithargyria* and *albi-*

puncta, which are common.—E. FOLOGNE, *Bruxelles, Rue du Marais Sn. 5, No. 16*; December 30, 1856.

COMMUNICATIONS.

Lepidoptera in the New Forest.
—One fine morning in June my brother and myself started from our country house at Clayhill, Lyndhurst, about two miles into the forest. Our way led principally through a heathy country intersected with clumps of beech and oak. On the oaks I took *Diphthera Orion*, and on the beech I took a quantity of the Green Silver Lines, with occasionally a *Cleora viduaria*. We went on until we came to the locality for *Aporia Crategi*, which was in a valley dotted here and there with the blackthorn; here we took about forty specimens in very good condition. *Euthemonia russula* was very common just here, as was also the Green Forester. We beat a great quantity of "Carpets" from the oak, among which we took about a dozen Clifden Beauties. At the same spot, or within a quarter of a mile off, is an enclosure, where about a month afterwards we caught nine *Apatura Iris*, of which seven were females, about fifty White Admirals, and abundance of *Argynnis Adippe* and *Puphia*, among which were several dark varieties of the female *Paphia*, called by London collectors the Black *Paphia*; they informed me they were very good things. We also took a number of *Æ. quadra* and the Black

Footman; the latter was exceedingly abundant. Two other sorts of Footmen were frequent here, but I have not yet determined the names of them. About three miles from Lyndhurst is a locality for *Arge Galathea*, which we took in such abundance that we filled all our boxes in less than an hour—about fifty altogether. *Thecla Quercus* was frequent, although not so common as in some years. I went sugaring on two occasions with a collector who took during the time he was there, that is the season, fifty-three *D. Orion*. We never saw a *Triphæna subsequa*, but I took two *Orion* at sugar. *Leucania turca* was very abundant at sugar; I frequently counted four or five specimens on a tree at a time; the Silver Arches was also common. The first night I went we remained about two hours, and I filled upwards of 120 boxes: it was a famous night for sugaring. I subsequently went to the sea-coast in search of *Hyale* and *Edusa*, but I never saw one *Hyale* and only one *Edusa*. Early in the spring I took several *Drepana Humula*, which I believe is a very good insect. I have taken about 1100 specimens this year; of course a great many duplicates. If spared I intend next year to devote more time to the pursuit of this fascinating Entomology, when I hope I shall be able to supply some of my brother entomologists with local species which they do not already possess. I have disposed of nearly all the duplicates of those I mentioned in the 'Intelligencer.'—ALFRED COLBORNE OAKLEY, *Hope Villas, Southampton*; December 11, 1856.

A Plea for Insects.—I thank

you for inserting the "Plea for Insects," though I do not think your remarks at the end are a sufficient answer to it, while they seem to forbid further expression of opinion. You seem to fasten upon me two notions, which I must at once disavow, and my article does not appear to me to express (1) that it is possible to force men to be good, and (2) that I expect all entomologists to be members of the church to which I belong.—E. HORTON, *Wick, Worcester*; January 3, 1857.

Errata.—At p. 130, col. 2, line 18, for "pastime" read "motive," and p. 131, col. 1, line 27, for "mostly" read "entirely."—ID.

[We insert this note because our correspondent thinks we have not been quite fair to him; but we adhere to our determination not to have an argument on the question. We know too well what it would lead to. Already the parties spoken of are saying they are misrepresented, and we should soon be in the midst of an acrimonious controversy, out of which no good would come.]

Two Days Hunting of Butterflies and Moths in Suffolk.—I left London July 21, and when riding from the station to the "Old House at Home" I noticed a good number of *Thecla W-Album* on some thistles by the road side. There I had found them for several years previously: three years ago I took thirty specimens in a few minutes. This time, however, my nets were as yet all packed up, so I did not disturb them. After spending a pleasant evening with old friends I arranged my nets and boxes ready for the morrow. Morning arrived, and I started at

five o'clock for a wood where I expected good sport. On my way there I beat three splendid specimens of *Halias Quercana*, and a number of other things from some young oaks. On I walked, net in hand, ready for *W-Album*; but alas! the destroyer was before me: a labourer was that moment engaged in trimming the hedge-row, and my hopes were like the blooming thistles—prostrated: not a *Thecla* was to be seen. After pelting the neighbouring elms till my arms ached, I succeeded in dislodging a few, and at last captured half a dozen with great difficulty with my Emperor net, for they would not come down, but flew hurriedly round the tops of the trees when disturbed and soon alighted again. I was sadly disappointed, as I had promised to supply a number of friends with this species. *W-Album* is very uncertain in its flight: I have sometimes seen the hedges swarming with them; the next day they would be on the tops of the elms and not come down for several days. Some years ago I suddenly lost a whole colony of them: I had daily seen them round the elms, but one morning I missed them. Two days after I found them swarming on a field of mustard in full bloom a short distance off: they did not then attempt to ascend to the trees, but kept flitting about like the Small Copper and Blue Butterflies. Arrived at the wood I chose a small open space to commence operations in, where the honeysuckles and brambles bloomed prettily around the low bushes. In a few minutes a fine female *Argynnis Paphia* was in my net: I pinned her to a bramble, and in a

very short time captured fifteen beautiful males. Now and then *Sybilla* swept over the bushes out of reach, and though they once or twice deigned to wheel round my head not one would alight. This was very trying, as I knew that had been a favourite place with them in former seasons, but it was plain they had chosen a fresh spot for their "Metropolis." However, I patiently waited; and so quiet did I stand for an hour that a fox trotted past within forty yards of me, and a jay repeatedly fed her young in a tree over my head. At last I shifted my quarters and forced my way through the wood, —no easy matter, as there are no glades or paths of any description, but only a small open space here and there: I reached the edge of the wood, and found the extreme border had been cleared of timber: this space was about half a dozen yards wide and the entire length of the wood, without trees, but overgrown with bramble, honeysuckle, and wild flowers of every description. What a scene was there for a naturalist! I gazed in wonder and delight. The noon-day sun was shining in all his glory; not a sound was to be heard but the hum of insects that were there in hundreds! —in thousands! One long bright belt of insects and flowers lay before me: the beautiful *Sybilla* floated gracefully past, and fearlessly alighted on the bramble at my feet. *Paphia*, "Silver Queen," was on every knot of bloom; *Adippe*, too, sported merrily round, chased from flower to flower by *P. Sylvanus* and *Linea*, that were there in swarms; there flitted the quiet-looking *Athalia*. Contemptuously

snapping his wings at intruders sat the bright-winged *Rhamni*; *Urticæ* and *Hyperanthus* too were present in hundreds, while myriads of gaily-coloured flies and bees, and a strange ichneumon-looking thing as big as a hornet darted rapidly past me every moment. Driving furiously along was that Jehu of moths *L. Quercus*. There, too, on a sandy hillock lay another old acquaintance, a fine adder, neatly diamonded with umber and black, and coiled round like a watch-spring. In the dry ditch at my feet lay several large snakes, already disturbed by my presence, and slowly gliding away over the dry leaves; one, in particular, was bright with yellow and green. A pretty lizard lay gasping in the sun on an old gate in front of me, the pathway to which was overgrown with pretty yellow flowers gaily studded with numbers of *C. Phlæas*. After watching the various things round me for some time, I went to work with my net, and succeeded in taking thirty fine specimens of *Limenitis Sybilla*, fifteen of *Adippe*, thirty-five of *Paphia*, five *Athalia*, and numbers of all the others I mentioned, filling every box and using every pin I had with me. Next morning at six o'clock I was on the road to another wood, about eight miles distant, in search of *Apatura Iris*. I arrived there about half-past eight o'clock, but the old keeper was dead, and I tried in vain to get leave from his successor to enter the wood. "There was nothing there," he said, "and it was no use trying; besides he expected some gentlemen there to look at the timber, and he would have no

fly-catchers about." I was sadly vexed, as I had set my heart on capturing *Iris* that day, but 'twas no use pleading. However, at last he said I was welcome to hunt in the "Little Thicks." This was a small wood half a mile further on. Thither I proceeded, and in the course of the morning I captured about thirty *Adippe*, forty *Paphia*, thirty *T. Quercus*, four *T. W-Album*, three *polychloros*; from the underwood and low boughs I beat one *Chærocampa Porcellus*, six *Lithosia miniata*, two *Cossus ligniperda*, *Platypteryx Lacertula* and *falcula*, *Notodonta Camelina*, *Geometra Papilionaria*, *Hemithea Cythisaria*, *Eurymene dolobraria*, *Eucosmia undulana* and another *Halias Quercana*, besides a host of other things, again filling all my boxes, and being obliged to stick several insects on one pin, though I thought I came well provided. Just as I was thinking of leaving the keeper's son came up: luckily we had met before in some woods in another locality where he had been keeper some years back: he recollected me, and we seated ourselves on the grass in the shady glade and discussed the merits of a large stone bottle of excellent home-brewed he fortunately had brought with him: from that we got to a trial of shooting on a small heath close by, and at last I was allowed to visit my favourite wood, that had been forbidden ground in the morning. The keepers clock struck five as I entered: I began to feel plain symptoms of weariness, but I walked down the glade. "What gleams through the wood in the bright sunshine?" 'Tis *Iris* by Jove? I was in an instant as

strong and fresh as when I started in the morning. My twelve-yard bamboo went together in a twinkling, and I was ready. He comes again! he is on the oak; one sweep—he is safely pinned in the hat of the keeper, who runs to the house to find me another box (all mine being full). A few minutes after I saw another *Iris* seated with closed wings on the outside bough of a magnificent oak. It is mine—a fine female! Soon after I thought I saw another hanging from the under side of a bough of an immensely tall oak. I could but just reach it, and was delighted to find a splendid pair (*in coitu*) safe in my net. I caught another beautiful male soon after, and I then left off, as it was half-past six and I had a long walk before me. As I was walking back through the glade the large Fritillaries were retiring for the night. I several times stopped to notice them: they chose generally a spreading oak; they alighted on the outside boughs and proudly marched up and down the leaves, apparently fanning gently with their wings, and turning round in a most amusing manner. In a few minutes they would then quietly creep under between the leaves, and I saw no more of them. One incident I had almost forgotten to mention. In the morning I found a fine female oak Egger (*L. Quercus*) in the hedge: I enclosed her in a piece of net and pinned it to my arm. I was soon surrounded by males that crawled and fluttered all over me: I might have taken scores if I had wished. I was pleased to find that all the specimens I had taken in these two

days were beautifully perfect and fresh, with few exceptions. Among the specimens of *Paphia* was one spotted with white on the upper side of the front wings.—D. T. B.; December 24, 1856.

A miner in Yew-leaves.—While procuring some fir branches for Christmas decorations I observed a number of deserted mines; and after long and careful search I discovered an inhabited tenement which I enclose to you, hoping it will be of service, as I see no notice of any fir-miners (at this season) in the 'Companion' or 'Annals.'—JOHN BRAIN, *Sleight's Bridge, Whitby; December 29, 1856.*

[The "Fir" sent is *Yew*. The miner may be the juvenile form of the *Tortrix*, *Ditula angustiorana*. If it be a *Tinea* we do not know it.]

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENEE'S NOCTUELITES.

[Continued from p. 143.]

Miana.

In the larva state the species of this genus have a more uniform manner of life than those of *Apamea*: these larvæ are vermiform, rather short, very much attenuated at each end, and so full that they appear difficult to bend without breaking. They live in the lowermost stems of herbaceous plants, seek the moistest portions, and sometimes penetrate so deeply that they reach the root. If they are fed in plants fixed in bottles

full of water, they often go through the neck of the bottle and finish by drowning themselves. However, in nature the knots of certain grasses present an obstacle of sufficient resistance to stop their progress. Some even content themselves with hiding among the leaves which sheath the stem, or conceal themselves under moss near the plant.

The perfect insects are known at a glance by their small size, not larger than a *Bryophila*. The abdomen is strongly crested and carinated, and the anterior wings always entire, narrow, and a little prolonged at the apex. The reniform stigma is in most species concolorous, though well marked. (Vol. I., p. 214.)

[To be continued.]

TO ENTOMOLOGISTS AND OTHERS.

It is with feelings of confidence that we take the liberty of calling your attention to the following sad case of affliction.

John Hemmings, of 2, Bedford Buildings, Brighton, has for a great number of years been a most indefatigable student of Natural History. Although entirely a self-taught man, he has, by great perseverance, made himself most efficient in Lepidoptera, Coleoptera, &c., and has also attained a praiseworthy rank amongst botanists by his researches relative to British mosses and other tribes of plants.

Unfortunately he has, by severe study, overtaken his brain: his mind has given way, and he now lies stretched on a bed of sickness,

utterly unconscious, and obliged to be constantly attended by two men. To share his affliction he has a wife and seven small children, who have hitherto been entirely dependent on his exertions for support.

Hemmings has, throughout his life, been a thoroughly steady man and worked diligently at his trade as a painter, but the requirements of his numerous family have prevented his accumulating any money.

Having been appointed a Committee for that purpose, we take the liberty of asking your sympathy under the painful circumstances, and to beg any little pecuniary assistance it may be in your power to render to an afflicted, but worthy individual, and his distressed wife and family.

Hemmings has had many correspondents to whom he has rendered great assistance in their several departments of study. It is the intention of the Committee to write directly to those whose names they may ascertain; but as it is quite evident many of them will be overlooked, we have thought it best to solicit a portion of your space for insertion of the above, as no doubt they and many other kind individuals will be glad of the opportunity of alleviating the sufferings of one who has fallen a sacrifice to his love of study.

Any contribution will be most thankfully received by either of the undersigned.

Thomas Thorncroft, 87, North Lane, Brighton; Samuel Howse, 82, St. James' Street, Brighton; Henry Cooke, 8, Pelham Terrace, Brighton.

TESTIMONIAL TO THE REV.

JOSEPH GREENE, M.A.

It is proposed to present to the Rev. Joseph Greene, M.A., a Silver Trowel, as a small mark of gratitude and esteem for his very valuable and detailed information on the subject of 'Pupa Digging,' published in the January number of the 'Zoologist,' and for the highly important service he has by this means rendered to the Science of Entomology. All gentlemen of the net who sincerely desire to join in the acknowledgment of the same, are requested to communicate their intentions to the Rev. J. Johnson, Denby Parsonage, near Huddersfield, as soon as possible.

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On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months. (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAINTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 14.]

SATURDAY, JANUARY 24, 1857.

[PRICE 2d.]

LOCAL ASSOCIATIONS.

It is scarcely possible to draw up a list of the insects of a district without the co-operation of several persons, for some species are so scarce that they fall to the lot of few, and others are so local that one only out of many collectors in a place may know of their existence. If, then, neighbouring collectors remain isolated they are mutually impoverished both in specimens and knowledge, whereas if they were united together there would be a corresponding benefit to each of them. It is true they might impart their information to each other without being formally associated into a Society, but the stimulus of *esprit du corps*, which is a main element in the composition and success of all Societies, would be wanting. It is not necessary that a local association should possess a collection of insects, which, as experience has proved to large Societies, is only an encumbrance, but it might well manage to have a selection of standard books.

Scientific books are expensive things, and beyond the reach of most individuals; but a very serviceable library might be procured by the united subscriptions of a few persons. Probably one of the members could give the books house-room; but for many reasons the meetings of the Society had better be held at the homes of the members in rotation. In few places would there be enough entomologists to constitute a "Society" proper; generally "Club" would be a more appropriate designation. The rules of the Club should be few and simple, it being understood as a *sine qua non* that every member will so behave as not to make himself disagreeable to others—very trite and old-fashioned advice, but unfortunately not the less necessary. Associations of earnest and unselfish men would not only be able to investigate the Entomology of certain districts, and discover what species they possess, but they would establish data with respect to the distribution of species, and increase the qualifications of the members as scientific

entomologists. There are so many reasons then why entomologists should unite that we offer this suggestion to the earnest consideration of the brethren of the net scattered throughout the country; and if we can be of any use in the cause our pages are at their service. We should also be glad to know of the existence of any entomological associations already formed, and to hear something of their doings.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

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Several communications only wait for room.

G. F. MATHEWS.—Send your proposed list.

R. CARTMEL.—We reserve your last until we see your next.

DUPLICATES AND DESIDERATA.

Lepidoptera.

DUPLICATES.

Papilio Machaon,
Polyommatus Alsus,
" Adonis,
Chærocampa Elpenor,
Euchelia Jacobææ,
Lithosia rubricollis,
Orgyia cænosa,
Semaphora Psi,
Nonagria Typhæ,
Cerigo Cytherea,
Polia flavicincta,
Aplecta advena,
" nebulosa,
" herbida,
Phlogophora meticulosa,
Thyatira Batis.

DESIDERATA.

Trochilium, any except Timpuliformis,
Procris Globulariæ,
Liparis chrysorrhæa,
Clisiocampa Castrensis,
Zenzena Arundinis,
Notodonta chaonia,
" Dodonæa,
Acronycta Ligustri.
—WILLIAM C. HALL, 51, Trumpington Street, Cambridge; January 1, 1857.

CAPTURES.

Agrotis saucia.—I have taken twelve specimens of *Agrotis saucia*

this autumn; and as it is a rare moth you may like to publish the occurrence in 'The Substitute.' They came to sugar, mostly on damp nights. I did not know at first that they were *saucia*, but took them for *suffusa*; and as I knew *suffusa* to be very common I threw a good many of them away.—G. F. MATHEWS, *Raleigh House, Pilton, near Barnstaple*; December 26, 1856.

Speranza conspicuaria.—Though the piece of intelligence I have to announce comes rather late in the day, yet it was *news* to me only a week ago, and probably will prove so still to your readers. It is this:—*Speranza conspicuaria* occurred plentifully in one locality near this place last season. Unfortunately I was from home at the time, and therefore remained in utter ignorance of this brilliant addition to our local list, till on looking over the captures of a small-boy entomologist last week I discovered half-a-dozen *ruined* specimens of this pretty insect. Afraid to trust my own eyes I submitted the best of the bad to Mr. Greene, who returns it to-day as a genuine *Speranza conspicuaria*.—HUGH A. STOWELL, *Faversham*; January 9, 1857.

COMMUNICATIONS.

What's his Name?—I fear Mr. Cooke has in this cotton and iron age forgotten the poetic of the past, and having paper made from straw and shavings never thought of the writing materials of Jupiter, nor recollected whereon his own career entomological was to be in-

scribed, otherwise he could not have been in doubt as to the spelling of the name of his new *Grammatophora*. Of course *Diphthera* is pure Greek; and had Mr. C. looked into Treitschke he would have seen its meaning, "eine abgezogene und zubereitete Thierhaut," as well as its classic allusion, for this author was evidently of a highly poetic turn, "das Fell der Ziege Amalthea." Ochseneheimer it is true printed it *Diphthera*, and gave it on Hübner's authority, but Hübner spells it *Diphthera*, and so Treitschke quotes it and defines the genus. M. Guenée calls the genus *Diphthera*, no doubt inadvertently, as he gives all the intervening authors as synonymous. Mr. Cooke would do well to consider whether, as there is already a "*diptheroides*" on the *Noctua* lists, some other name would not be preferable.—PROH PUDOR.

Duplicates and Desiderata.—I am just as unwilling to enter into a "paper warfare" as "Sufferer" can be, but I certainly cannot allow his remarks ('Substitute,' p. 137) to pass unnoticed. He accuses me of intimating that he is "no gentleman." This assertion I meet with a simple denial. Remarking upon a line of conduct which, as he asserted, had been pursued towards him by certain entomologists, "Sufferer" observed, "It is a disgrace to the entomologists of Great Britain." In reply, I said, "This is strong, nay, I think, unjustifiable and unwarrantable language." I think so still. To say that, in your opinion, a certain statement is unjustifiable and unwarrantable, is simply to say that, in your opi-

nion, such a statement is not justified or warranted by facts. This is the interpretation I put upon those words ; but, if wrong, I shall be happy to be corrected by "Sufferer." Had I said that he used this language *knowing* that he was not justified by facts, he might reasonably have taken offence. But I did no such thing. I simply gave it as my opinion (to which I still adhere) that he was not justified or warranted in using the language of which I complain against the *collective* body of British entomologists, simply and solely because certain parties had treated him in a manner which *he* thought disgraceful, and I cannot but hope that my entomological brethren will, for the most part, coincide in this opinion. If "Sufferer" sees in the expression of this opinion an intimation that he is "no gentleman," he certainly has an unenviably sensitive temperament, and must, I fear, "suffer" from many things besides the disgraceful conduct of British entomologists. But, perhaps I am wrong in supposing that it was this portion of my observations which has wounded his feelings, and that the true cause of offence is to be found in the remark, "I am always ready to assist (if in my power), without stipulating any return, *bonâ fide* beginners, when gentlemen, *i.e.* gentlemen in their dealings and conduct." Now can it be *possible* that he supposes I here allude to *him*, one whose very name I do not know, and whom, to my knowledge, I have never either seen or heard of! *If* this be his idea I cannot but think that a little calm reflection will show him how utterly ground-

less it must be. Next it is asserted that I appear "to think it *wrong* to request those who give notice of duplicates to state what return they expect," and then I am charged with doing it myself. Surely "Sufferer" must have perused my remarks very hastily. If my readers will kindly turn to page 101 they will find that, after giving *Mr. Norcombe's* reasons for thinking such a course *right*, I immediately add, "In the main I concur in this view." At page 102 I say, "But lest I should appear to claim more credit than I deserve, I freely confess that *generally* when I send good insects I expect, and think I am entitled to expect, a return." These quotations satisfactorily dispose of the above charge. Next it is said, "An indirect intimation is no use at all!" Why not? I should have thought that with so sensitive a "Sufferer" an indirect intimation would have been quite sufficient. I suppose, however, that I must yield to your correspondent's superior judgment, but still I would venture to ask his *reasons* for making such a strange (as it seems to me) assertion. With regard to notices in the 'Intelligencer,' I know nothing. No reference was made to that publication by either party. One word with regard to "a case in point" and I have done. It is too long to quote, and I must therefore refer my readers to page 138. Let us carry out the theory enunciated in this "case in point." Let "Sufferer" suppose himself, after years of intense application, to have obtained a distinguished rank among the Mathematicians of the day. Well, a young man

comes to him a perfect stranger, and requires him to impart his information to him for *nothing*, adding that it is his *duty* to do so, and that he, the applicant, is entitled to *expect* it from him. What would "Sufferer" do in this case? Would he take the juvenile aspirant to his arms? Would he, uncheered by the hope of reward or return, devote his few leisure hours to "teaching the young idea how to shoot?" If of an unusually benevolent disposition, he *possibly* might do so. But should he happen to say, "My time is valuable, my leisure hours few, I am sorry I cannot employ them in the way you propose without some return," what would "Sufferer" think did the applicant reply, "You are a disgrace to your profession, your only idea is £.s.d." I might say much more on this subject, but it seems to me useless. Every man has a just right to expect a fair return for his labour. He may forego that right if he please, and in so doing may deservedly claim the praise of his fellows. But to say that B may *require* C to forego that right, and in default may accuse him of being selfish and mercenary, seems to me alike harsh and unjust. Lastly, I would remind "Sufferer" that if he writes severely and *anonymously*, he must expect no quarter. His concluding sneer I can afford to pass by, simply observing, that I am neither afraid nor ashamed to sign my name and address in full as follows.—REV. J. GREENE, *Playford, Ipswich*.

Phlogophora empyrea.—It appears there is a screw loose at Brighton, because some parties are charged with having attempted

to sell foreign insects as British. But is Brighton the only place? have none been sold in London and other places? But I know that parties often get a name for selling foreign insects as British when such is not the case. I will state a case in point. A few days ago I paid a visit to a friend at Woolwich, and his words were, when he saw me, "So Harding, I hear you have been buying foreign insects, relaxing them, and selling them as British." "Well," I replied, "I did not know it; I have not bought any. Where did you get your information from?" "Oh," he said, "from Mr. C. close by." "Well," said I, "let us go and ask him what he knows about it." On asking Mr. C., "Ah," he said, "Mr. S. told me a short time back." "Well," I said, "I will write to him and tell him what you have told me." "Oh," said Mr. C., "I thought I would put you on your guard, but I should not like my name mixed up in the matter." Now such a charge as this ought not to rest till the truth is out. Some writer has said that "Truth is sometimes treason, and should not at all times be spoken;" but I hope the parties, if such can be found, will at once speak out, and publish in 'The Substitute' when, where, and of what species they ever bought of me, insects that were foreign. If Mr. Cooke knows parties that have acted dishonestly, why does he not name them? What is he afraid of? Nothing like the truth. I know that dishonest persons will always give honest parties a bad name. What was said of me when I turned up *Plusia orichalcea* on the coast?

Why, that I had been over to France for them: yet who will say so now? If parties who have been deceived will publish the names of the persons who have deceived them, it would put others on their guard, and the thing would be, in a great measure, put a stop to.—H. J. HARDING, 1, York Street, Church Street, Shore-ditch; January 3, 1857.

Melitæa Cinxia.—Your facetious Wick correspondent, who so obligingly undertakes the defence of insects generally, and *Lepidoptera* in particular, and who constitutes himself reporter of the Transactions of the "Metropolitan Bombyx Society," seems to have some confusion in his mind with regard to the time of appearance of *Melitæa Cinxia*, which I hope, with the assistance of the 'Manual,' to be able to clear up for him. If he will take the trouble to refer to page 46 of the work just mentioned, (or, if he prefers, to the 'Zoologist' for 1846, page 1271,) he will find there the following observations by Mr. Dawson. "The earliest date on which I have met with it is May 1st; the latest in July; but in the latter case the specimens were bred in captivity. I never remember to have seen it so late in the state of liberty; not later, indeed, than the middle of June here." (Speaking of Sandown in the Isle of Wight.) On reading these remarks, and comparing them with my own experience when in the island, I must say it rather astonished me to hear that while "I was rolling in the clover," any collector, however assiduous, could have captured and pinned "500 *Cinxia*," seeing that the operation

just alluded to took me about three minutes to perform, and also that the latest period of *Cinxia*'s appearance at liberty was the "middle of June," while all that I have related in the 'Substitute' took place on the 31st of July. I also wonder where the "500 *Cinxia*" hid themselves from me, or whether only showed themselves to the devouring collector mentioned by your correspondent; for I must say that, although very frequently at Sandown and its vicinity, far from seeing anything like "500 *Cinxia*," I never beheld a single specimen, at which I was not surprised, for I expected none so late in the season.—ROLAND TRIMEN, 71, Guildford Street, Russell Square; January 7, 1857.

Acherontia Atropos.—The following extract from 'The Journal of a Naturalist,' third edition, p. 325, may not be uninteresting. "Their changes are very uncertain. I have had the larva change to a chrysalis in July, and produce the moth in October, but generally the aurelia remains unchanged till the ensuing summer."—S. BINGHAM, Newnham; January 5, 1857.

Rearing of Acherontia Atropos and Deilephila Galii.—As the question of the duration of *Atropos* in pupa has lately been discussed, the following account may not be uninteresting. In this district *Atropos* was abundant last year. I had fifty, and I know of at least twenty others being taken. As I wanted specimens for my cabinet I procured all I could, and succeeded in obtaining the most of those dug up in the potato fields. Ultimately I had fifty chrysalides, and two of *D. Galii*, of which the

larvæ were taken on the Gog-Magog hills (about 4 miles hence), and were brought to me in that state. I purchased them after they changed to chrysalides (October 11). I had determined to force out the insects by heat to avoid the risks of accident during a long winter, and all my friends and fellow-collectors here predicted, for my encouragement, my total failure, as I was going to try a novel way of forcing. I need not say that the appearance of two splendid specimens of *Galii* has changed their opinion considerably. My plan was this:—I had two square tin cases, like boxes, without covers, the one an inch wider each way, and two inches deeper than the other: of these the smaller contained the chrysalides lying on moss and covered up with a thick layer of the same; this was always kept damp. Over this tin was a frame covered with net to prevent the escape of the insects: this tin was supported inside the layer, so that the tops of the two were level. The larger tin was then filled with water, which was kept hot by a small spirit-lamp underneath: this kept the temperature regular, the water being about 80° or 90° (Fahrenheit), while the chrysalides were, on the average, about 70°. I see from my Journal that the earliest date on which I obtained any chrysalides of *Atropos* is September 22, three *Atropos*; September 23, four *Atropos*; September 27, three more, &c.; October 11, two *D. Galii*. As I was then expecting more chrysalides to be brought I deferred putting the case in hot water, till I was disagreeably surprised by the ap-

pearance of one crippled *Atropos*, November 7th, and three more on the 14th. I then commenced burning the lamp, and had no more deformed specimens. The following is a table of the dates of the appearance of the insects:—

1 crippled	. . .	Nov. 7
3 "	. . .	" 14
1 perfect <i>Atropos</i>	. . .	" 18
1 "	" .	" 25
2 "	" .	" 29
3 "	" .	Dec. 8
3 "	" .	" 9
4 "	" .	" 10
2 "	" Dec. 14 or 15?	
1 "	" .	Dec. 17
1 "	" .	" 20
1 <i>D. Galii</i>	. . .	" 20
1 "	" .	" 31

I feel no doubt that had I commenced earlier the addition of heat I should have had no cripples. I was absent on the 20th and 21st November, and my servant was irregular in attending to the lamp: to this I attribute the loss of twelve pupæ, which I subsequently removed, in which the insect was perfectly formed. As the heat was not then kept regular, I think that it was not sufficient to stimulate the insect at that critical time. I can add nothing, I regret, to elucidate the origin of the noise made by this insect as to whence it comes, and whether purely vocal or mechanical. All of my specimens squeaked very loudly, except the last, which could not by any amount of worrying be made to cry. Nature seemed not to have gifted it as the rest of its fraternity, and the closest examination failed to detect any external difference. I do not agree with a former correspondent in thinking that the case

hollowed by *Atropos* in the earth is waterproof, as a *damp* heat appears essential to success in rearing them. I have had *Atropos* before. The shortest time of existence as pupa I ever noticed was in the case of one in 1852, which came out on the seventeenth day after it entered the earth: this was kept damp in a case with moss on the kitchen mantel-piece. I consider myself very fortunate to rear both the *D. Galii* when half my specimens of *Atropos* died.—ALFRED F. SEALY, 70, Trumpington Street, Cambridge; January 7, 1857.

In reply to the question of "C. A. A." and the editor's note on the subject of *A. Atropos* and *C. Elpenor*, which appeared in last week's 'Substitute,' I may mention that dryness in the breeding-cage usually kills the pupæ of *A. Atropos*, at least as far as my experience goes. I may here quote a remark of Mr. Haworth's, which I find in Westwood & Humphrey's 'British Moths.' "Perhaps in a state of Nature they (*i.e.* the larvæ of *Atropos*) perform their extraordinary metamorphoses deeper in the ground, and consequently in a moister and more equal temperature than most other species of *Lepidoptera*; and if so, the cause of their perishing in our breeding-cages is undoubtedly owing to their having in their cages too scanty and dry a soil." (Vol. I., p. 12.) This I can confirm, having observed that the larva of *Atropos* buries itself five or six inches deep. This may account for the abundance of the moth at some seasons, and its rarity at others. For if the surface of the ground be hard and dry the moth will be unable to force its way

out: probably if the heat of this year be not sufficient the moth may remain in pupa till another season. This is conjecture; but it is certain that if the autumn be warm they occasionally change to the perfect insect then, otherwise not till the next summer. The larvæ of *C. Elpenor* feed on plants growing in moist situations, and therefore the larvæ require such in which to undergo their transformations. I have frequently lost both *Elpenor* and *porcellus* by keeping them dry, but usually succeeded in rearing them when kept moist.—ID.

The Cabinet Question.—Your leading article of November 29th led me to wonder what price a cabinet could be made for, and knowing something of the trade, by having a good deal of cabinet work made for instruments I manufacture, I thought I would get up a cheap one for myself, which will be finished in a fortnight. To commence:—The drawers are large, being 20 inches by 16 inches and 2 inches deep; the bottom of them is made of the softest pine, perfectly free from knots, and may possibly not require corking; the four sides are made of the best pencil cedar; the glass will rest on fillets of cedar fixed round the inside. The case is made of pine well seasoned, stained to imitate mahogany, and French polished, so that few would know what wood it really was; the door is panelled, and when open shows a front of twenty cedar drawers, has a lock and key, and is a handsome piece of furniture. The expense of the above to me will be a little under £3, glass, corking, lining, &c., of

course extra. If cabinet makers will not supply entomologists with the above at £3. 3s. I will myself, as it will pay me to do so and it ought to pay them.—HENRY BAKER, 90, *Hatton Garden, London*; December 29, 1856.

[Cedar wood is objectionable for drawers on account of a resinous exudation from it which spoils the insects. Mahogany wood will not be much dearer.]

Setting Corks.—A remark in 'The Substitute' of December 20, induces me to mention a plan which I have followed in order to avoid the expense of purchasing the regularly prepared boards. Instead of buying these I have boards of soft deal made by a carpenter after the same pattern: these I have made of different sizes; and the cost of a board three times as long as one of the prepared corks is only sixpence. I find that they answer quite as well as the corks; but perhaps for insects set on very thin pins it would be as well to put a strip of cork in the groove, a thing which any one can do for himself.—T. G. BONNEY, *Churchdale House, Rugeley*.

Forcing Lepidoptera.—I have seen *Macroglossa stellatarum* forced in the following manner:—The pupæ were laid on a layer of earth in a common iron pot, the lid was put on and the pot placed near the fire, near enough to make the air within the pot about hot-house heat. The plan seemed to succeed admirably, for the insects came out in splendid condition. Care must be taken not to let the earth get too dry.—ID.

Tin Larva-boxes.—Since my letter appeared in 'The Substitute'

of the 20th instant I have had a great number of applications respecting my setting corks, breeding-cages and larva-boxes, asking me to make them for sale: I take this opportunity of thanking my correspondents for their kindness in offering to purchase of me. As to the two first-named articles I must decline, but shall think it no trouble to show any one how they can make their own. As to the larva boxes made in tin with perforated tops I shall be most happy to make them at 4s. 6d. per dozen, or in exchange for insects that I may not have. If any one wishes to exchange with me he will be so kind as to forward his list of duplicates and state how many boxes he requires.—W. H. LATCHFORD, 1, *Plumber's Place, Corporation Lane, Clerkenwell*.

The New Clap-net.—Since my article appeared in 'The Substitute' of November 29th on the subject of my new clap-net handles, I have had numerous applications for them, which has put me to some expense in stamps, &c.; therefore I beg to say I shall charge 5s. for them in future instead of 4s. 6d. I shall always be willing to obtain the net for entomologists, but I do not think I ought to entail any expense on myself in doing so.—J. B. STONE, *Lupin Street, Birmingham*; January 10, 1857.

OBITUARY.

It is with great regret we announce that the sudden and deplorable affliction of Mr. John Hemmings, of Brighton, termi-

nated in death on the 10th inst. We have known Mr. Hemmings for many years as a most indefatigable and clever collector of insects. His knowledge of insects was considerable; he was a man without any kind of pretence, and thoroughly conscientious. The appeal made in our columns last week on behalf of his young and helpless family is now doubly important, and it has our best wishes and recommendation. It is the intention of the Subscription Committee, if the sum raised be sufficient, to put the widow in the way of getting a living as a laundress, which business she understands, and we hope all who can appreciate the pursuit of knowledge under difficulties (and naturalists in particular), will show their sympathy with the present case of one who has fallen a victim to his zeal, by aiding the family of John Hemmings in the battle of life.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENEE'S NOCTUELITES.

[Continued from p. 154.]

Caradrinidæ.

In my Index I had united this family to the *Leucanidæ* on account of the genus *Simyra*, which appeared intermediate between them; since I have perceived that this latter belongs to the *Bombycoïdæ*. I have no longer any objection to make against the family *Caradrinidæ*, which is certainly very natural.

The larvæ have a peculiar as-

pect, which it is difficult to mistake when one has reared only a few. They are short, stiff and sluggish; they coil up with the slightest touch, and may be handled and thrown about with impunity, protected as they are by the stiff hairs which originate from their spots; they eat little at a time, and grow slowly even in the spring.

The perfect insects are not brilliant, of small or moderate size, and almost all of an ashy or yellowish grey colour. The lines and spots are generally distinctly marked. They fly in great numbers at dusk, and have the same habits as the *Noctuidæ*, that is to say, when they quit one flower they rise suddenly and settle abruptly on another.

None of the larvæ of *Caradrinidæ* are injurious to agriculture. They only attack useless plants, with which they do not make great havoc, although they are sometimes rather numerous. This family is principally composed of European species, of which the greater part have been very long known, and I might say too long known, for there exists respecting them such confusion that their synonymy is almost inextricable. The English authors have increased this difficulty by creating such a crowd of species so little characterized that I have not even been able to class them as constant varieties. The French and Germans themselves are little agreed respecting some of the most widely different species: hence it is not surprising that in general they are misnamed in collections. It will be seen whether I am more distinct and more for-

tunate than my predecessors.
(Vol. I., p. 234.)

Grammesia.

Mr. Stephens has separated this genus from the ancient genus *Caradrina*, and M. Duponchel has imitated him. I now think that they are right, and that its characters are well marked. The larvæ still more onisciform than those of *Caradrina*; the antennæ, the palpi, &c., appear to me to render the separation necessary.

The genus *Grammesia* is reduced to a single species, for the *bilinea* which has been tried to be separated from it is only a variety. (Vol. I., p. 235.)

Hydrilla.

I have preserved for this genus the name *Hydrilla*, which M. Boisduval gave to it, but I have at the same time considerably modified the genus. In fact there is great difference between his *H. palustris* and *obliterata*, and his *H. caliginosa* and *aquatilis*, and lastly his *H. uliginosa* appears to me a true *Caradrina* of the group of *lenta*.

The genus *Hydrilla* thus reduced is one of the most abnormal of all the neighbouring families. That which is particularly remarkable is the difference of the sexes: one may say without exaggeration that it is in the *Noctuæ* the analogue of *Chemerina* in the *Geometræ*, and *Diurnea* in the *Tineidæ*; so dissimilar is the female to the male in shape and form, one would take it for a dwarfed specimen.

The species of *Hydrilla* are not numerous, and generally rare. One only was known to ancient

authors. Of their transformations we only know what Treitschke says: their manners appear to be quite similar to those of *Caradrina*: they enclose themselves in autumn in earthen cocoons, where they pass the winter in the larva state, and do not change to chrysalis till the spring. It is said they are very difficult to rear in confinement. (Vol. I., p. 237.)

[To be continued.]

THE ENTOMOLOGIST'S COMPANION.

By H. T. STAINTON.

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When to catch Micro-Lepidoptera.

To collect the Larvæ of Micro-Lepidoptera.

Table of appearance of British Tineina.

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On the Habits of Tineina Larvæ.

Calendar of British Tineina appearing in the Larva or Pupa state.

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THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAINTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 15.]

SATURDAY, JANUARY 31, 1857.

[PRICE 2d.]

INSECT DEALERS.

To the collectors of British insects for sale the entomologists of this country are greatly indebted for the discovery of many species that it is probable would not have been known as natives, or at least not for a long time to come, for these men have been the explorers of parts of the kingdom where, until they went, no entomological foot ever trod, and in these new localities found species that are the ornaments of every collection. We do not grudge them a proper return; they live by collecting and have earned their reward. Their calling is quite an honourable one; and if we cannot capture insects ourselves, as we prefer to do, and cannot get them given to us, then there is no course open to us but to buy them.

But while we admit the propriety of selling British insects, yet, so long as we have a special taste for natives, we must insist that what we buy for British are really indigenous; not merely that the species are so, but the speci-

mens also. Collectors have been sometimes accused of passing off foreign specimens as British, asserting they had captured them in England, and although sometimes the species were not known abroad, they were declared to be foreign; *Noctua subrosea*, for example, which was afterwards taken in abundance in the fens. Such examples should make us cautious in saying that a species is not British, because there seems some probability that it is not. There are honourable men among collectors who would not stoop to such a dishonourable act, but on the other hand we are bound to say there are others that it would be difficult to believe. But then comes the question, why are foreign insects palmed off as British? Simply and entirely on account of the tremendous prices that certain persons will give for rarities, and such prices operate as great temptations to men of small means and principle. Is it right to hold out such temptations, and is it wonderful, considering how vast they are to the parties to whom they are applied, that de-

ception should be used? The practice of naturalising foreign insects is not new: we believe that *Chrysophanus Chryseis* was introduced into the British Lists by a dealer's "dodge;" *Papilio Podalirius* also, and several other reputed British species, besides hosts of specimens of rarities foisted upon us as natives, although imported from the Continent, sometimes in the pupa state in order to deceive us easier, but all brought with the express purpose of committing a fraud. The last alarm has been about *Phlogophora empyrea*; and although the introduction of foreign specimens of it to be passed off as British has not been publicly proved, there is a general belief that the trick was intended, although not perhaps in the way our correspondents seem to think. One diseased sheep taints a whole flock, and honest dealers must not be surprised at the stigma thrown upon their body by the nefarious doings of one or two of their number.

But there are other dealers besides the acknowledged ones. It is too true that some collectors hoard up their "good things" and bargain with them quite as keenly as any seller; in fact they make quite a business of their exchanges. Such a spirit is simply disgraceful, and quite unworthy of a naturalist. There is a still

worse grade than this, but fortunately the examples are rare. Everybody has heard of the *La-thonia* trick, performed by a "Reverend" professor of sleight of hand and slight of principle,—a speculation with a "job lot" as it was happily termed by a writer in the 'Zoologist:' we need do no more than record our execration of such doings. That people under such circumstances should cease to buy insects is not wonderful: we know many who aver they will never buy again. But another result will follow, that no rare insect and no specimen of a new species will hereafter be deemed worth a straw unless its capture in Britain can be authenticated beyond all doubt, for as matters stand everything out of the common is suspected.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be con-

tinued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & Co., PATERNOSTER Row, as well as of the Publisher.

Several communications only wait for room.

C. TEMPLI has omitted to send us his English name.

W. JORDAN.—Smith's 'Catalogue of British Bees' contains descriptions of the species and plates. It is printed by order of the Trustees of the British Museum, and is difficult to procure through the book trade. Our publisher will supply it post free at the Museum price, 6s.

COMMUNICATIONS.

Death of Pupæ of Acherontia Atropos.—Perhaps I can answer the question of C. A. A. by asking him one question: How did he know the pupæ were dead? The reply may show the very reason why they died. After the caterpillar has once gone into the ground it should *never* be seen again. I should say that nine pupæ out of ten that are seen either die or the imago comes out with shrivelled wings. I have in former years reared them with much success in the following manner:—I have put the caterpillar into a large garden-pot half filled with earth and covered with gauze, and fed them with the

same food I have found them on; and I may here remark that it is very difficult to get them to change their food. When they have gone into the ground I have never disturbed them, but put the pot into a hot-house or kitchen, watering it every morning with milk-warm water, and in the course of a month or six weeks out has come the imago in perfect condition. I recommend every one to follow this plan, for they are more certain of a perfect insect.—GEORGE R. READ, *Rectory, Sutton-on-Derwent, York.*

A Day's Ramble round the Vicinity of Dorking.—On the 30th of June my friend Mr. Braithwaite accompanied me on an excursion to Dorking. The weather was very fine, and insects were abundant. Having reached Dorking by the railway we passed through the town, took the first turning to the right and continued our course up the road until we came to a lane on the right, which led us to Ranmore Common. We now commence operations by beating the hedge; out fly two specimens of *Acidalia lutearia*, which are soon captured and boxed. A little further up the lane we took *Zerene procellaria* and *Z. adustaria*. We have now reached the top of the lane and have to cross the rail, on the other side of which is a large clover field. We were no sooner in this field than two blue butterflies attracted our attention; I pursued one, which proved to be *Polyommatus Agestis*, and my friend the other, but after a long chase in the broiling sun he lost sight of his. He said he really believed it was *P. Acis*. At the edge of the field we found the

larvæ of *Cucullia Verbasci* on *Verbascum Thapsus* nearly full fed, but very much ichneumonised. We are now in the open road again: here I caught *Phibalapteryx Vitalbata*, and along the roadside we found the pupæ of *Anthrocera Lonicerae* in plenty. By taking the first turning to the left we find ourselves in a large chalk-pit swarming with insects: *Polyommatus Albus* and *Pamphila lineata* were in abundance here, of which we captured a few. We saw one specimen of *Grapta Calbum*, but it was in such a shocking condition that it was not worth taking. I did not feel quite satisfied about *Acis*, so I left my friend in the chalk-pit and went back to the clover field, but found no trace of *Acis*. I caught several more specimens of *P. Agestis*. After sweeping all over the field without success I returned to my friend, when we left the chalk-pit and proceeded to Norbury Park; but here we only captured a few common insects, and being dinner-time we made the best of our way to the "Running Horses" at Micklemham to refresh the inner man, and not to waste time we commenced operating upon our *Verbasci* larvæ by pulling off the eggs of the ichneumons, a kindness which the larvæ did not seem to appreciate at all, but I believe we saved a few of them. Having finished dinner we go on to the Downs, where *Gnophria rubricollis* was flying in profusion over the tops of yew trees in the sunshine. *Ennychia cingulalis* and *Pyrausta purpuralis* were plentiful on the Downs. After spending some time here we think about returning, and pass

through Beaching Wood, where *Abraxas Ulmaria* was flying about in abundance, but as we were pressed for time we only took about half-a-dozen specimens each. I took one specimen of *Zerene albicollaria* in very fine condition. It was of no use stopping any longer, for we had to run all the way from Beaching Wood to Dorking, where we arrived only just in time to catch the train. I hope there were many other entomologists who enjoyed themselves as much as we did that day.—G. E. BALDWIN, *Albany House, Barnsbury Park.*

The Testimonial to the Rev. J. Greene, M.A.—In answer to the communications already received on this behalf, and to those which may arrive in due course, I beg to say that the smallest sums will be available, as the desire is that the "many," and not the "few," may be sharers in the pleasure of contributing. — REV. J. JOHNSON, *Denby Parsonage, Huddersfield; January 20, 1857.*

[We have been asked who is appointed to receive the subscriptions.]

The Testimonial to the Rev. J. Greene.—I am sure all entomologists will fall into the views of the Rev. J. Johnson, of Denby Parsonage, as to the propriety of presenting some token of approval to the Rev. J. Greene, M.A., by whose labours so much assistance has been given to the collectors of Lepidoptera. A novelty is a rare thing in the present day, and when a new path to success in unveiling the secret habits of insect life during their wonderful changes is brought before our

notice, we ought to hail the pioneer with that tribute of praise that shall be a stimulus to excite proper emulation and urge them on, showing that an observant society is ever ready to acknowledge true merit and permanent progress. With regard to the labours of the Rev. J. Greene, although he has before given us his *modus operandi*, still his remarks in the last number of the 'Zoologist' are so much more in detail than his previous communication to the Entomological Society as to give a new impetus to his excellent plan of obtaining pupæ, and almost to clothe it in a fresh garb. For this his merit stands conspicuous, and as all entomologists are fellow-labourers in the great field of insect life, although not all Coleopterists, Neuropterists or Lepidopterists, still we mutually assist one another, and any new method of capture that secures success to one is sure to reflect a light upon the others: thus many insects, not of the order of Lepidoptera alone, are attracted by sugar; many strange and fanciful forms are daily exhumed by the pupa-hunter whilst pursuing his laborious avocation, besides numberless cases of the Ichneumonidæ; and the lamp, so attractive to the moth, likewise allures to its homage a variety of other insects. As the love of investigating the exquisite attributes of Nature leads us to higher and nobler thoughts, so each benefactor, from whose light we catch a ray, ought not to be overlooked in the ardour of our pursuit and the eagerness of our chase, lest the coldness of neglect leave the lamp untrimmed and the light to be extinguished.—

C. J. Cox, *Fordwich House, Fordwich*; January 17, 1857.

Phlogophora meticulosa.—One day last autumn I captured a few of the polyphagous larvæ of *Phlogophora meticulosa*: some of them were feeding in the tubes of some onions, others were greedily devouring the flowers of some pinks, others were busy among the tender leaves of some scarlet geraniums. I put a few of them into one of my boxes for larvæ, and assiduously attended to their wants until they were full fed: they but ill-requited my attentions I am sorry to say, for as soon as ever they had reached a condition when as I thought they ought to have neatly constructed their puparia in the corners of my box, each morning when I examined it I found to my surprise that one or two of them had contrived their escape. This went on until every one of them had gone. I searched my room for them ineffectually, and at last gave the matter up as hopeless. The other day I had occasion to move some bird's eggs which had long been neatly packed away amid cotton wool in a cupboard in one corner of my room. While unfolding the wool which protected three or four of my eggs I found to my surprise a cocoon neatly constructed of the wool and ingeniously attached to a couple of the eggs, in which cocoon I beheld the pupa of my friend *Phlogophora meticulosa*. On unpacking more eggs I came across several other pupæ, all, more or less, attached to various eggs, and all enveloped in cocoons of wool.—MURRAY A. MATTHEWS, *Raleigh, near Barnstaple*; January 19, 1857.

The Bull and the Bull's Eye.—I heard a rather amusing story the other day from a sort of small collector who lives here. About 300 or 400 yards from my house there is a large open grass field surrounded by a narrow belt of plantation, which is again enclosed by a high stone wall. This fellow had seen me once or twice sugaring there, and living himself close to the spot determined to make a nice snug little monopoly of it. Accordingly he went several times very early, so that if I arrived I might find the ground already occupied. One night, determined to have a "good go," he had laid a pound and a half of sugar upon the trees and was proceeding to take his first round of inspection. The three first trees were covered with moths, and he was trudging along in high spirits when he heard a sort of loud breathing close at hand, and on looking over a slight thorn hedge bordering the plantation saw a huge bull attentively dodging his footsteps. "Never mind," he thought, "there is the

hedge between." Just as he arrived at the next tree—alive with moths, Master Bull walked through a gap in the hedge and confronted him. "Hollo!" says collector. Boo-o-o says bull, and comes a step nearer. "I say old fellow, you don't mean mischief?" But Mr. Bull did mean mischief. So my friend "doused his glim" and made with all speed for the wall, and at his heels was old bos, who just arrived in time to assist him gently over and deposit him on the other side.—*EBORENSIS.*

A Box of Insects Lost in November last.—As I can get no information by letters with reference to the above sent to Mr. J. Hardy, 43, Radnor Street, Hulme, Manchester, I shall feel obliged should this meet his eye by his returning my box *if he has received it* free of expense, the contents of which he is welcome to. Keeping a correspondent's box for three months is certainly a great piece of neglect and a great hindrance in the way of exchange.—*JOHN PORTER, 8, East Street, Lewes.*

BEETLING FOR BEGINNERS.

"Ille ego qui quondam cecini Bugfliwatham pulchellam."

After VIRGIL.

"Gentle Laura! silk-haired Laura!
Sunny, funny, romping Laura!
Laura of the Bugfliwatba!
Laura of the water bug-fly!
Come with me into the forest;
Come with me into the meadow;
Come with me to Hokempokem;
Where the bubbling brook runs sparkling,
Or beneath the steep bank darkling;
Come with net, for beetles hunting;
Come with boxes beetle-hunting;
Come, the young and old together,

I will tell you all about them—
How to know them, where to find them.

“ Sit down on this bank of flowers,
Bank of buttercups and daisies,
While the trembling sunshine glinting
Through the murmuring rustling aspen,
Jocund dances all around us ;
Sit down young and old together.

“ First examine their antennæ
Coming forwards from the forehead ;
They are sometimes called the feelers,
And some think them ears for hearing,
But we know they are antennæ,
And were made for some wise purpose ;
What that purpose is we know not.

“ First in order come the Tigers,
Tigers of the insect races ;
For they all are fierce and savage,
Like their namesakes of the jungle,
Preying upon living victims ;
They are mostly gay and glittering,
And fly swiftly in the sunshine ;
Their antennæ are quite simple,
Tapering gradual to the summit ;
Tiger beetles we may call them,
Tigers or CICINDELINA.

“ Next in order, the ground-beetles,
Also feed on living insects ;
But they wander seldom flying,
And most often in the night-time ;
Still a few delight in sunshine,
And these few are called sunshiners ;
Their antennæ all are tapering,
And we name them CARABINA.

“ Now we come to water-beetles ;
Beetles that can swim like fishes ;
Live and dive beneath the water ;
And there hunt for other insects,
Catch and kill them without mercy,
Just as Tigers or ground beetles :
Their antennæ too are tapering,
And we call them DYTISCINA.

“ Last of all the tyrant beetles,
Feeding on their living victims,
Feeding also on dead bodies,
Come these long and narrow fellows
That turn up their tails in anger,
If you tease them, if you touch them :

THE SUBSTITUTE.

Their antennæ like a necklace
 Made of black pearls strung together,
 With the biggest always outwards,
 Almost always sliced off sideways:
 They have stout and square wing-cases;
 And their body is uncovered,
 So that they can turn their tails up:
 Kirby called them all rove-beetles;
 We will say STAPHYLININA.

“There are other water-beetles;
 Beetles of all sorts and sizes,
 Swimming, diving in the water,
 Living in the water gardens,
 Feeding on the leaves and flowers:
 Their antennæ are not simple,
 Sticking straight out from the forehead,
 But are always knobbed, and hidden
 In a hole beneath the skull-cap:
 These we call HYDROPHILINA.

“Next come these gay sexton-beetles,
 Gay, but smelling, O! so horrid!
 For they feed on putrid bodies;
 They have also knobbed antennæ,
 And the knob is hard and solid:
 We will call all such SILPHINA,
 Sexton-beetles or SILPHINA.

“Look at this bright green rose-beetle,
 Feeding in the heart of flowers,
 On the pollen from the anthers;
 And at this great buzzing watchman,
 He delights in something nasty;
 And at this forlorn cockchaffer,
 Shaken from the tree above us,
 Where he feasted on the green leaves:
 All these three have knobbed antennæ,
 And the knobs are all divided
 Into thin and flat divisions:
 These we call SCARABÆINA;
 We call all such beetles, chaffers,
 Chaffers or SCARABÆINA.

“What is this but a click-beetle!
 If upon its back you lay it,
 Up it leaps with sudden snapping:
 Now examine its antennæ,
 They are slim throughout and serrate,
 Serrate, that is notched or saw-like:
 These may all be called click-beetles,
 Clicks or snaps, ELATERINA.”

“ Tell me what are Soldiers, Sailors,
Always crawling on the pathways,
Poor things ! always getting trod on,
Always climbing up the fences,
Always buzzing in the hedges,
Clambering on the grass and flowers ;
Here is one upon your trowsers.”

“ They are called TELEPHORINA ;
They are soft and very tender,
Not at all like hard-cased beetles ;
Their antennæ are quite simple,
Neither serrated nor club-like.

“ Pray remember all these beetles,
These nine tribes which I have showed you,
Always have the feet five-jointed.

“ Now then come a tribe so diverse
That I cannot well describe them ;
Their antennæ greatly vary,
Some are tapering, some are club-like,
Some are comb-like, some are saw-like,
Some are thread-like, some are fan-like,
But their feet are always constant,
Fore and middle pairs five-jointed,
Hind pair always but four-jointed :
Let us fix on what to call them,
HETEROMERA, BLAPSINA ;
These two names are sometimes given,
But I think I like BLAPSINA.

“ Next in order come the Weevils,
Little elephants long-snouted,
And their snouts antennæ bearing ;
The antennæ, too, are elbowed,
First bent backwards and then forwards :
We can call them snouts or weevils,
Or else CURCULIONINA.

“ These are followed by the long-horns ;
This is one so sweetly scented,
Scented like the oil of roses,
Oil or attar as you like it ;
This is called the great musk-beetle,
But they are not all sweet-smelling,
Yet they all have long antennæ,
Longer even than the body,
Long and gently tapering outwards :
These we call CERAMBYCINA.

“ Look at these plump shining beauties,
Fat and round as any dumpling,

Often decked in brilliant colours,
 Green and gold and rainbow-tinted ;
 All their feet flat and four-jointed ;
 Their antennæ like a necklace,
 All the pearls alike in bigness :
 These we call *CHRYSOMELINA*.

“ Lastly clad in mail of scarlet,
 Or in clearest, purest, yellow,
 And in either case, black-spotted,
 Are these round and pretty beetles,
 Which we know as *Aphis*-feeders :
 They have short and clubbed antennæ ;
 And their feet are but three-jointed :
 Everybody seems to like them ;
 Lady-birds we mostly call them,
 Lady-birds, *COCCINELLINA*,
 Lady-cows if you prefer it,
 But why birds or cows I know not,
 They are very pretty beetles.

“ There’s the end of my descriptions,
 Now I’ll tell you where to find them,
 How to catch them ——” but the pupil,
 Tired with such a lengthy lesson,
 Bounded off to join her sisters,
 Who with Ellen and Maria,
 Dipping deep in *Hokempokem*,
 Fished that limpid stream for minnows,
 Sticklebacks and sly stone loaches :
 Vainly did I call for Laura,
 She had reached the youthful fishers ;
 So I left the bank and joined them.

EXTRACTS.

PSYCHOLOGY OF THE LOWER ANIMALS.

This idea, by no means the exclusive property of M. Micheler, but common to him with poetic natures all the world over, may be briefly defined as that of the solidarity of Nature ; the union and interdependence of all her kingdoms, and their interpenetration by a common spirit, of which they

themselves, with all their glories, are but the exterior manifestation. Now, it is argued by writers of this school, the originating spirit or principle in question must of necessity be a mind. If so, the animate and sentient creatures it originates must themselves bear about with them the traces of mind. Consequently the physical science which deals only with externals helps the naturalist to fulfil but half his mission, which needs to be completed by a scien-

tific inquiry into the tempers and dispositions of the inferior creation; in other words by a consistent system of animal psychology.

So inveterate is our habit of viewing animals as machines, that these opinions will inevitably be at first regarded as considerably more strange than true. Why, it will be asked, credit animals with any character at all? Are they not the slaves of natural impulse and "blind instinct?" Do not entire species collectively present the same disposition? Observation says no. Let any one devote a little attention to his acquaintances' pets, and he will discover, as we lately observed of the sea-anemones, that the individuals of the different species agree to differ, displaying as great a variety of disposition as their owners. He will find that the vague and unphilosophic term instinct is in fact made to cover as many diverse qualities as charity covers sins; and that, when employed in its ordinary acceptation, it cannot fairly be used to account for more than the animal's method of meeting the physical necessities of its life, and has nothing to do with the finer varieties of temperament. To state our position briefly and plainly, all the qualities that are common to every member of any particular species belong to instinct; and everything that can be predicated of individuals belongs to character. Instinct may very well teach every cat to catch her mouse, but cannot teach one to leap on your knee and another to run into a corner. These are varieties of disposition, and to investigate varieties of disposition is the province of psychology. Is it

said this can only apply to the higher animals? Our imperfect knowledge of natural laws teaches us at any rate their universality. Finding the rudiments of higher physical organizations in the simplest beings, we may infer traces of mental organization also, however at present invisible to our gross perception that the study is uninteresting? The objection cannot come from a lover of Nature. That it is uncertain, fanciful, incapable of establishment on a secure foundation, but very capable of leading to wild speculation and grotesque absurdity of thought? Is not all this equally true of human metaphysics and psychology? Yet mankind would feel under small obligation to him who should make a *tabula rasa* of the labours of all who have speculated from Anaxagoras to Schopenhauer. — *Literary Gazette*.

BRIGHTON.

YOUNG MEN'S CHRISTIAN ASSOCIATION.

On Tuesday last, the 27th inst., Mr. H. T. Stainton delivered a Lecture on Entomology at the Town Hall to this Institution. The Lecture was quite of an elementary nature. Mr. Stainton mentioned the distinctive characters of insects, touched briefly on the various orders, and after alluding to the transformations of insects, gave as examples the histories of several well known species.

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Dipterous Notes and Queries. By W. W. Saunders, F.R.S.

How Insects Breathe. By John Lubbock, F.G.S.

Entomological Works published in England in 1856. By the Editor.

Entomological Works published Abroad in 1856. By the Editor.

London: John Van Voorst, 1, Paternoster Row.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (MR. H. T. STAIN-TON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 16.]

SATURDAY, FEBRUARY 7, 1857.

[PRICE 2d.

MICROSCOPIC ENTOMOLOGY.

THE microscope opens such a world of wonders where there was apparently nothing existing, that it can scarcely surprise us if the possessors of microscopes use them to magnify every small object that comes in their way, and that there is comparatively little available knowledge achieved by their employment. There are of course exceptions, but the rule is that he who has a microscope becomes a microscopist, and does not use the instrument for the investigation of a series of related objects. Thus microscopic science consists in a great degree of isolated facts, valuable no doubt, and to become more so hereafter, but not of the same service as observations on structures assimilated to each other.

There seems in fact, so to speak, a waste of patience in making microscopic preparations of objects and in looking at them, because the knowledge acquired bears no sort of proportion to the time occupied in making it. The same time and the same instrument, if

the observers only had a definite object in view, might work out results, in Entomology for instance, of which at present we have no idea. It is to this we wish to draw attention. There is many a young mind in which the desire to learn Nature's secrets—the wish to know—glows like the sacred fire of the altar. Pressed by fate, it may be to live in a city, the man finds the spark grow dim within him; but if possessed of a microscope what should hinder the smouldering embers from rising to a flame. Few may be the man's excursions, and short the time for making them, but to one bent upon microscopical investigations collecting and collections, in the ordinary meaning of the terms, are unnecessary. A little material will go a great way, for in a little what an expanse lies unexplored! In the anatomy of insects how much remains to be discovered, how much to be recorded that has never been noted!

"The fashioned limb and lubricated
joint
Within the small dimensions of a
point."

How much in the wonderful me-

tamorphosis of insects is yet obscure! and how little do we know of insect physiology. How many senses have insects? Who can tell why or how bees have thousands of workers—sexless individuals in fact—and only one mother but many fathers. Look at the somewhat similar anomalies among ants, and the curious circumstance that these insects make prisoners of beetles of very remarkable forms. What is the bond of union between them? Then there is the peculiar method of increase among *Aphides* and some other insects called “Alternation of generation,” where several races continuously are mothers.

Now all these matters literally require to have light thrown upon them for microscopists to investigate how they are brought about. To do so effectually it is requisite that the inquirers should have some entomological knowledge, and as many of our collectors at present seem wild about arranging and naming their specimens, and disputing whom they shall follow, we may call their attention, while they are halting, to the above as a few out of many questions which they may turn to without the necessity of following any one.

A microscope of sufficient power for most purposes may be had for three or four pounds, and with a little patience will soon become a

familiar friend. Failing a microscope the young entomologist may fall back upon a Coddington lens, procurable for a few shillings. This instrument has as great power as many microscopes, is more portable, and in some respects easier to use, because it may be accommodated to the light, whereas with a microscope the light must be accommodated to the instrument. The greatest advantages of the latter are that the power may be increased, and the field of view is larger, though of course this last diminishes as the power increases. Only take up the subject and work at it with a will, then you will have obtained knowledge, and, as our ignorance is so great, possibly fame, but at all events the conviction that you have honourably and usefully rescued time from probable waste.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF ‘THE SUBSTITUTE,’ 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

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Several communications only wait for room. —

A. B. C.—We require a few more letters to make a name, not necessarily for publication.

Mr. Newman begs to acknowledge the receipt of Six Shillings from Mr. Machin and friends for the widow of the late Mr. Hemmings, and has forwarded the amount to Mr. Cooke.

DUPLICATES AND DESIDERATA.

Lepidoptera wanted.

Glæa erythrocephala,
 Dasycampa rubiginea,
 Valeria oleagina,
 Hadenæ satura,
 „ assimilis,
 „ thalassina,
 „ Genistæ,
 Xylina petrificata,
 Cucullia Scrophulariæ,
 „ Lychnitis,
 „ Gnaphalii,
 „ Absinthii,
 „ Chamomillæ,
 Aporophila australis,
 Cloanthæ perspicillaris,
 Heliothis armigera,
 „ peltigera,
 „ Scutosa,
 Abrostola triplasia,
 Anarta cordigera,

Anarta melanopa,
 Plusia inscripta,
 „ bractea,
 Toxocampa pastinum,
 Ophiodes lunaris,
 Acontia luctuosa,
 Micra ostrina,
 Erastria venustula,
 Hydrelia Banksiana,

PYRALES.

Pyrausta cingulalis,
 Prodelia literalis,
 Ebulea ciliaris,
 Scopula alpinalis,
 Spilodes palealis,
 Botys hyalinalis,
 Madopa Salicalis,
 Polypogon derivalis.

Duplicates.

PYRALES.

Pyrausta octomaculalis,
 Cledeobia angustalis,
 Stenia punctalis,
 Ebulea crocealis,
 Odontia dentalis,
 Rivula sericealis,
 Pionea stramentalis,
 Botys fuscalis,
 „ terrealis,
 „ pandalis,
 Mecyna asinalis,
 Stenopteryx hybridalis,
 Polypogon grisealis,
 Hypena proboscidalis.

GEOMETRÆ.

Metrocampa margaritaria,
 Enrymene dolabraria,
 Odontopera bidentaria,
 Crocallis elinguaris,
 Himera pennaria,
 Angerona prunaria,
 Macaria notataria,
 Aspilates gilvaria,
 Numeria pulveraria,
 Eupisteria hepararia,
 Speranza conspicuaria,
 Anisopteryx æscularia.

[To be continued.]

—H. J. HARDING, 1, York Street,
Church Street, Shoreditch.

CAPTURES.

The following Lepidoptera have been taken in the county of Worcester since 1818. Those marked * are common.

Pieris Cratægi,*
 „ *Daphnice*,
Leucophasia Sinapis,*
Colias Edusa,
Thecla Betulæ,*
Polyommatus Acis,
Argynnis Lathonia,
Melitæa Artemis,*
Vanessa C-album,*
Trochilium Cynipiformis,*
 „ *Myopæiformis*,
 „ *Chrysidiformis*,
Ægeria Apiformis,*
 „ *Bembiciformis*,*
Sesia Bombyliformis,*
 „ *Fuciformis*,*
Chærocampa Celerio,
Deilephila Euphorbiæ,
 „ *Galii*,
Sphinx Convolvuli,
Acherontia Atropos,*
Anthrocera Loniceræ,*
Lithosia helveola,
 „ *aureola*,*
Nudaria mundana,*
Euthemonia Plantaginis,
Liparis monacha,
Orgyia Coryli,*
 „ *gonostigma*,
Clisiocampa castrensis,*
Eriogaster lanestris,*
Trichiura Cratægi,
Pæcilocampa populi,*
Gastropacha Quercifolia,
Endromis versicolor,
Zeuzera Æsculi,
Hepialus velleda,*
 „ *sylvinus*,*

Limacodes Testudo,
Platypteryx lacertula,*
 „ *falcula*,*
 „ *hamula*,
 „ *unguicula*,
Cerura furcula,*
Stauropus Fagi,
Petasia cassinea,*
Ptilodontis palpina,
Notodonta dictæa,*
 „ *dictæoides*,
 „ *dromedarius*,
 „ *ziczac*,
 „ *Chaonia*,
 „ *Dodonæa*,
Clostera curtula,*
Semaphora tridens,
Acronycta Alni,
 „ *Ligustri*,*
Ceropacha ridens,
 „ *ocularis*,
 „ *or*,*
 „ *fluctuosa*,
Cymatophora viminalis,*
 „ *Oo*,
Bryophila glandifera,*
Nonagria extrema,
Cerigo Cytherea,
Noctua rhomboidea,*
Spælotis ravidæ,
 „ *pyrophila*,
Agrotis saucia,
 „ *corticea*,*
Heliophobus popularis,*
Tæniocampa rubricosa,
 „ *munda*,
Anthocelis lunosa,*
Tethea retusa,
 „ *subtusa*,
Cosinia pyralina,
Cirredia xerampelina,
Xanthia aurago,
 „ *citrago*,
Xantholeuca croceago,
Dasyampa rubiginea,
Dianthæcia capsicola,*
 „ *Cucubali*,
Hadena lutulenta,

Hadena satura,
Aplecta tineta,
 „ *advena*,*
Xylina petrificata,
 „ *semibrunnea*,
Cloantha conspicillaris,
Heliothis marginata,
 „ *Dipsacea*,
Plusia Festucae,
 „ *bractea*,
Abrostola triplasia,*
Pyrausta octomaculalis,
 „ *purpuralis*,*
Pionea stramentalis,*
Spilodes cinctalis,*
Botys hyalinalis,
Hypenodes albistrigalis,
 „ *costæstrigalis*,
Geometra papilionaria,*
Phorodesma bajularia,*
Chlorochroma viridaria,*
Pericallia Syringaria,
Eurymene dolabraria,
Epione apiciaria,*
 „ *advenaria*,*
Ennomos lunaria,
 „ *illustraria*,
 „ *fuscantaria*,
Aventia flexularia,
Eupisteria hepararia,*
Hibernia aurantiaria,*
Boarmia Roboraria,
Tephrosia consonaria,*
 „ *extersaria*,
Eubolia cervinaria,*
 „ *mensuraria*,*
Coremia unidentaria,*
 „ *Ligustraria*,
Thera Juniperaria,
Anticlea rubidaria,*
Steganolophia Ribesaria,
Harpalyce silacearia,
 „ *picaria*,
Phæsyale psittacaria,*
 „ *miaria*,*
Lobophora hexapteraria,*
 „ *sexalisaria*,
Acasis viretaria,

Scotosia Roamnaria,
 „ *vetularia*,*
Phibalapteryx Vitalbaria,
Eucosmia undularia,*
Melanippe hastaria,*
 „ *rivaria*,*
Abraxas Ulmaria,*
Bapta taminaria,
 „ *temeraria*,
Ephyra orbicularia,
Eupithecia pulchellaria,*
 „ *coronaria*,*
 „ *plumbeolaria*,*
 „ *Centaurearia*,*
 „ *Succenturiaria*,
 „ *subfulvaria*,*
 „ *pusillaria*,
Dosithea immutaria,*
 „ *scutularia*,*
 „ *reversaria*,*
 „ *ornataria*,
Acidalia candidaria,*
 „ *Blomeraria*,*
 „ *remutaria*,*
 „ *aversaria*,*
Minoa Euphorbiaria,*
Halias prasinana,*
 „ *Quercana*,*
Sarrothripa Rewayana,*
Tortrix cinnamomeana,*
 „ *Viburnana*,*
 „ *Brandieriana*,
Leptogramma literana,*
Peronea rufana,
 „ *cristana*,
 „ *Hastiana*,
Penthina picana,
 „ *marginana*,*
Sideria achatana,*
Sericoris grapholitana,
 „ *micana*,*
Roxana arcuana,*
Euchromia flammeana,*
Phtheocroa rugosana,*
Sciaphila alternana,
 „ *passivana*,
Capua ochraceana,*
Clepsis rusticana,*

Grapholita Paykulliana,*
 „ nigromaculana,
 „ obtusana,*
 „ nævana,

Pædisca profundana,
 „ ophthalmicana,

Ephippiphora dissimilana,
 „ fæneana,
 „ nigrocostana,
 „ tetragonana,
 „ obscurana,

Heusimene fimbriana,
 Dicrorampha Artemisiana,*
 Catoptria Westwoodiana,
 Eupæcilia sodaliana,
 Argyrolepia Dubrisana.

—J. & E. SMITH, *Turkey Street, Worcester.*

[We have struck out of the list sent to us the names of all those species which are common everywhere.]

COMMUNICATIONS.

Leiocampa dictæa and *dictæoides*.—I deemed it proper to procure evidence corroborative of my own respecting these species, and I now hand you the following extract from a letter received from Mr. J. B. Hodgkinson, of Preston:—"In reply to your queries about *L. dictæa* and *dictæoides*, my information is that I have specimens of *dictæa* bred from brown larvæ. *Dictæoides* we never bred at Carlisle to my knowledge; still it may occur there. We used to suppose we had both species, on account of the existence of green as well as brown larvæ. We then had Wood's plates to go by, and could really distinguish no difference: something like *Acronycta Psi* and *tridens* which are only distinguishable by the difference

in their larvæ. We then bred *dictæa* from brown larvæ obtained from off birch!! This is what you want to know;—also *dictæa* from green larvæ off the poplar, and specimens of both bred at that time I still possess. As an instance of my non-knowledge of the difference in the perfect insects, I sent fourteen years ago to Mr. Edleston one specimen bred from brown larva as *dictæoides*, which is only *dictæa*. Since then my knowledge of the difference of the perfect insect is such that I could pick one *dictæoides* out of five hundred *dictæa*: had I not still possessed original specimens I might have fancied some error of judgment might have occurred. My brother was chief larva-hunter, and he can bear me out, so can my father, and I doubt not Mr. Cooper can bear the same testimony." With your permission I will briefly review the case. My statement is that I have taken brown and green coloured larvæ off the birch, and bred *dictæa* only. I never heard of a *dictæoides* being bred in Cumberland, but do not affirm that it has not. Mr. Hodgkinson, of Preston, has bred *dictæa* from brown larvæ taken off the birch, and from green larvæ taken off the poplar: his father and brother have both done the same. Mr. Gregson says the larvæ vary from light drab to brown, and will feed on birch. Mr. Crewe says larvæ, sometimes brown and sometimes green, feed on poplar; *dictæoides* on birch. Mr. Doubleday bred *dictæa* from brown larvæ, which fed on poplar. Mr. Logan does not allude to their food. Mr. Smith only alludes to *dictæoides*. Mr. Greene describes the differ-

ence in the larvæ, and then says "The *dictæoides* always feed on birch," the *dictæa* on various poplars, never he believes on birch.—R. CARTMEL, 13, *Williams Grone, Walworth.*

Local Associations.—Some years since I was connected with the Carlisle Entomological and Botanical Society, under the guidance of a gentleman of considerable acquirements as a naturalist, and ardently devoted to the objects of the Society; I allude to Mr. Hodgkinson, senior. Perhaps a short sketch of the mode of operation adopted by the Society may be suggestive to schools, and to those persons residing in the same place, but having no unity of action. Each member paid three-pence per week for the purchase of property, and the following useful works were amongst their purchases: Woods 'Index Entomologicus,' containing plates of all the British butterflies and moths; Rennie's 'Conspectus;' 'Witherington's Botany,' and plates of all the grasses. The meetings were held one night in the week at the house of one of the members, and each individual stated his experience for the week. This was highly advantageous, for as each member took a different locality a greater area of ground was searched than could be explored by one individual. But this excellent plan could not always be successfully carried out, for by the nature of their employment some were limited in their time and others had more time at their disposal; it was, therefore, found desirable that each member should have a separate collection irrespective of the Society's. The

members corked their own boxes; and here let me remark that there is a white excrescence of a fungoid nature growing on *old birches*, which, when dried, is far superior to cork for setting insects upon; it will take a surface almost as smooth as glass, and pins penetrate it easier than cork. I forgot to state in its proper place that the books of the Society were on the table each meeting night, and were lent for the week, and some members copied from Rennie and Wood the names, habitats and times of appearance of the insects: this system is a wonderful strengthener of the memory. Some of the members paid attention to Botany, making themselves acquainted with the plants on which larvæ feed; others again made larva-rearing their employment. The whole body were pupa-collectors in the winter. Thus a foundation for the desire of knowledge was laid which, I believe, has in no one single instance retrograded. During the summer many of the members and their friends would on one day of the week sally forth to some distant wood, competition giving an exhilarating impulse to their proceedings. From those excursions I have brought home hundreds of larvæ, necessarily many of one species, and thus living as it were amongst larvæ for years I have been perhaps insensibly led to study their manners and habits as I would those of a rational being: viewed in this way their peculiar ways become familiar and palpable.—ID.

Collecting Larvæ and Pupæ.—I know of no better system now for collecting larvæ than was pursued formerly. Many yards of

white cotton sheeting were sewed together to form one piece of large dimensions: this was placed under a tree, and with a pole as long as could be managed the top branches were beat; for the lower branches the umbrella is handier and more easily used. The instruments in use for pupa-collecting were the rake and trowel: the rake is useful for leaves and the surface soil; the trowel for digging. But some prefer the rake for all purposes; that with two teeth I like the best.—ID.

TESTIMONIAL TO THE REV.
JOSEPH GREENE.

*Mr. Newman to the Editor of
'The Substitute.'*

9, Devonshire St., Bishopsgate,
Jan. 24, 1857.

Sir,—On reading the Rev. Job Johnson's suggestion in 'The Substitute' (p. 155) for a testimonial to the Rev. Joseph Greene, an idea occurred to me which will be better explained by the following correspondence, which I have Mr. Greene's full permission to print and publish.

My object in addressing this correspondence to you is to obtain, through the medium of 'The Substitute,' Mr. Johnson's public consent to my attempting to carry out *his* design in an altered form, the entire merit of the idea resting with him.

Yours most truly,
EDWARD NEWMAN.

To the Editor of 'The Substitute.'

Mr. Newman to the Rev. Joseph Greene.

London, Jan. 22, 1857.

My dear Sir,—Fully participating as I do in the sentiment conveyed in the Rev. J. Johnson's proposition in 'The Substitute,' I still take the liberty of inquiring directly of yourself whether the presentation of a silver trowel be really the best mode of expressing to an entomologist the sentiment of gratitude for his literary services.

My own idea is that a complete copy of Guenée, Fischer, or some other standard European work on Lepidoptera, would be more appropriate.

I would also take the liberty of suggesting a London recipient of subscriptions, and the name of the universally esteemed President of the Entomological Society occurs to me, as in all respects, the most desirable.

Believe me, my dear Sir,
Very truly yours,
EDWARD NEWMAN.

Rev. J. Greene, M.A., &c.

*The Rev. Joseph Greene to
Mr. Newman.*

Playford, Jan. 23, 1857.

My dear Sir,—The proposition to present me with some testimonial in consideration of my paper on 'Pupa Digging,' published in the 'Zoologist,' was wholly unexpected by me. I can truly add that it does not appear to me to merit such a token of approval. At the same time, it would be idle in me to deny that such an ex-

pression of approbation emanating from my brother entomologists would be in the highest degree gratifying and acceptable.

In your letter you state that, in your opinion, a copy of Guenée's work on European Lepidoptera would be a more appropriate testimonial than that originally suggested by the Rev. J. Johnson. I trust that Mr. Johnson will not deem me either ungracious or ungrateful when I say that I cordially concur in that opinion.

With regard to your concluding proposal I must leave it entirely in your hands, at the same time requesting you to tender my sincere thanks to the (as you justly term him) universally respected President of the Entomological Society, should he kindly consent to undertake the office alluded to.

Believe me, my dear Sir,

Very sincerely yours,

JOSEPH GREENE.

E. Newman, Esq., F.L.S., &c.

TESTIMONIAL TO THE HON. J. PATIENT.

It is proposed to present to the Hon. J. Patient, of Oil-cum-Honey, one pound weight of solid gold pins, as a small but pointed testimonial of the value set upon his services in the distribution of rare foreign insects in Britain. It is thought that no better form for the expression of the opinion of his entomological brethren could be found than that of the instruments by which so many victims were fixed; and it is presumed that the gift will prove of eminent service to the distributor of such

priceless beauties at so cheap a rate. All who wish thus to join in testifying their sense of such disinterested exertions are requested to communicate their intention to R. E. Laxe and R. E. Pinne, Members of the Setting Committee, Dupe Street, Cheetham.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENÉE'S NOCTUELITES.

[Continued from p. 167.]

Caradrina.

This is one of the old genera on which all the world are agreed, though its characters are not easily defined. The larvæ are short, and as it were heaped together, always very full and of a firm consistence. Their spots are surmounted by hairs, very visible, stiff, short, and often curved in the opposite direction. Few larvæ are so slow and so sluggish. They live concealed amongst the low leaves, squatted in dry leaves or even buried in the gravel. Their growth is slow: hatched at the end of summer they live through the autumn and winter, and do not attain their full growth till the following spring. They feed throughout the winter, but little at a time, and only when the weather is mild and the sky is clear.

The perfect insects are generally of a grey or testaceous colour. I have divided them into three groups. The first approximates to *Acosmetia* by its broad shining wings, slender body, and geometriform aspect. The second has the body as robust as all the

other *Noctua*: the markings of the wings consist of the ordinary lines, which are very neat, distant from one another, the elbowed line always followed by a row of dots sometimes joined to it, and the stigmata well marked, surrounded by a paler rim: the femora and tibiæ are rather hairy. The third group has a very similar aspect to *Agrotis*, to which it forms a natural passage: the posterior wings are pale and iridescent, at least on the disk; the legs are less hairy but longer; the stigmata are not so neatly marked; one only, the reniform, is distinct, dark, and accompanied with little white or yellowish spots, which surround it or are joined to its extremities. (Vol. I., p. 242.)

NOCTUIDÆ.

This is one of the families which appears the most distinct if we consider as the type the true *Agrotis*, but which inclines much towards the *Orthosiidæ* as soon as we arrive at *Noctua*. M. Rambur thought he had found rigorous characters in the presence of the spines with which the anterior tibiæ are furnished, and in fact this character is excellent, but it is far from being absolute, since we find in the genus *Noctua* a small group which no one would think of separating from it (*Baja* and *sobrina*), which is more or less completely devoid of it, and among the *Agrotis* some single species which also do not present it. The family of the *Noctuidæ*, like others, only rests upon a certain number of characters which mutually support each other, but which lose their force when we attempt to separate them.

The larvæ of the *Noctuidæ* are of two sorts. The one is dull, velvety, rather brightly coloured, and with well-defined markings, especially the subdorsal line, which is often surmounted by an interrupted row of black spots, which increase in size towards the hinder segments, and which form on the twelfth segment, where they cease, two wedge-shaped spots, which meet at one of the corners. The other sort is shining, of dirty colours, and the principal markings are the ordinary spots, which are black, slightly warty, and very brilliant. The former live sheltered under dried leaves or bushes: the second have a more characteristic mode of life, and literally bury themselves during the day, either concealing themselves in roots, on which they principally feed, or constructing cavities, in which they avoid the light or enjoy the coolness. Often they only protrude the anterior portion of the body from these holes so as to reach the lowermost leaves. "It is," said I in my essay, "a curious spectacle to see those that we rear in captivity forced to issue entirely to obtain a food which is no longer so much within their reach as in Nature. It seems as if air were not their element, or as if they could only breathe it in their subterranean abodes. And if we attempt to grow in the earth which we have provided them the plants on which they ought to feed, it is another pleasure to observe all the leaves in motion without being able to perceive the cause, and if we leave them for a few hours to find enormous tufts devoured by these invisible beings. And let it not be

thought that I am embellishing. It has often been my lot for an entire season to feed the larvæ of *Agrotis* without once seeing them, and to find literally in my cages the perfect insect in the place of the caterpillar which I had placed there. To sum up, all the larvæ of the *Noctuidæ* are thick, completely cylindrical, and without any kind of eminence except the ordinary spots. All live exclusively on low plants, avoid the light of day, and enter the earth in order to change to a chrysalis. The perfect insects which come from them are sometimes rather brilliant. The legs are almost always long and with distinct spines, and the palpi are generally well-developed. They fly rapidly, but several feel the effects, so to speak, of their origin, and pass almost their whole life concealed in the holes of trees or in the interstices of rocks. It is to this family that belong almost all those we find in country houses, hid in the rabbets of shutters and the hinges of doors, or at rest on the dark parts of walls and ceilings. The reason why we find them so often in our houses is because the larvæ are, so to speak, our intimate enemies. It is our gardens, our orchards, that they choose as the theatre of their ravages; the vegetables that we cultivate with care, or the weeds which grow in spite of us under our feet are equally to their taste, and it is in this family that the larvæ most injurious to horticulture are found." I have nothing to add to this sketch of the manners of this family; and as to the means of warding off their attacks I must refer to what I have said of

Triphæna pronuba, where I indicate the sole palliative, alas! very insufficient, which can be made use of. All the receipts which have been given, and I might almost add all that ever will be given with this end, will always fail of their effects, because we have here to deal with individual enemies which we must fight with one by one, and which their mode of life conceals even from the researches of the naturalist. The *Noctuidæ* are found throughout the globe, but principally in Europe and North America, that is to say, in temperate climates. Often the individuals of the two countries are completely identical, at other times they are only races of the same species, and when the species really are different there is often between them the greatest analogy. A great number have been known to authors, and as there is great difficulty in distinguishing them their synonymy is in general much confused. We notice a certain relationship between certain *Noctuæ* and some genera of the tribe of *Apamidæ*, but as a rule they are distinguished by a different general appearance, by the spines with which the legs are generally furnished, by the presence of the tongue, always tolerably developed, by the position of the wings in repose, by the complete absence of crests on the abdomen, &c. In fact, the genera *Heliophobus*, *Charæas*, *Episema*, &c., which are certainly most allied to this family, are recognised by the almost complete absence of the tongue, and the rudimentary and hairy palpi, as in the *Bombyces*. (Vol. I., pp. 253—255.) [To be continued.]

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Entomological Works published in England in 1856. By the Editor.

Entomological Works published Abroad in 1856. By the Editor.

London: John Van Voorst, 1, Paternoster Row.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAIN-TON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 17.] SATURDAY, FEBRUARY 14, 1857. [PRICE 2d.

THE MURDER OF THE INNOCENTS.

MAN is a hunting animal. In his wild state the instinct to kill is called into exercise by the necessity of providing himself with the flesh of other animals for food, and every individual must, as a matter of course, make himself master of the art of taking his game. In civilized communities the practice of killing wild animals is dignified with the name of "sport," and becomes the fostered privilege of a few, by whom it is pursued for the excitement it affords without reference to the use as food of the creatures killed. The slaughter of animals for the food of the people is reduced to the level of a business, and is confided to a lower grade of society.

Now to kill a tame animal for food we do not call cruel, because we believe in the necessity for doing so, and we wink at sport, although not a necessary occupation so far as providing us with food is concerned. But what can

be said for killing harmless insects? It has generally been excused, and even justified, on account of the advantages resulting to Science from collections of their dry bodies, and so far as this object is served there is little to be said against it. But we think it is time to urge a word in favour of the insect race, for now that collectors are on the increase there is danger that some of the more conspicuous and accessible species will be exterminated in Britain. This is not a sentimental or fanciful fear. Just think of the consequence if such raids become general as that mentioned by our correspondent in 'The Substitute' of 3rd January. *Artaxerxes* bottled; — execrable! Think of 500 *Melitæa Cinxia* and 2000 of *Polyommatus Corydon* slaughtered by one collector! What barbarism! We venture to say that a large portion of these latter insects will never be put to any purpose at all, for stuck as they were, from three to six on a pin, they would be useless in every respect; and even if they had all been separately

pinned and set, such wholesale doings cannot be defended. Suppose that one-fourth part of the 2000 *Corydon* were females (possibly there were more, but we will assume that 500 had not laid their eggs), and that each would have laid at least 20 eggs, then there were 10,000 caterpillars cut off at a blow. Under such a system, pursued by many collectors, extermination would be rapid. Is it not probable indeed that some of our insects are already extinguished in certain localities by such proceedings? There is *Vanessa C-album*, for instance, which in former time was common enough at Penge, but to our knowledge it has not been seen there or elsewhere near London for more than twenty years; and it is quite possible that the scarcity of this and other insects in places where for a long time they used to abound is due to the rapacity of collectors. This very possibility, we think, makes the subject deserving of consideration, and in addition there are the higher motives to forbearance that should actuate all true lovers of Nature. We should all be impressed with the conviction that no one has the right wantonly to deprive of life and enjoyment the exquisite and harmless examples of Creative Power.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed To THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER Row, as well as of the Publisher.

Several communications only wait for room.

DUPLICATES AND DESIDERATA.

Lepidoptera.—I now enclose my proposed list, so that any entomologist who is in want of any of the species can write to me now, and I will procure them for him in the course of the season; some of them are common in the South, though not Boreal species, so that some of our "northern" friends may be in want of them. I have also made a list of some of my

desiderata, for any of which species I shall be much obliged.

Duplicates that I (D. V.) shall procure this season.

Leucophasia Sinapis,
Thecla Quercus,
Polyommatus Argiolus,
" Agestis,
Argynnis Paphia,
" Aglaia,
" Adippe,
" Euphrosyne,
" Selene,
Melitæa Artemis,
" Athalia,
Vanessa Atalanta,
Satyrus Tithonus,
" Hyperanthus,
Pamphila Sylvanus,
Macroglossa Stellatarum,
Sphinx Ligustri,
Smerinthus Populi,
Anthrocera Lonicæræ,
Euchelia Jacobææ,
Lithosia rubricollis,
" complanula,
Arctia villica,
Phragmatobia fuliginosa,
" lubricipeda,
Lasiocampa Rubi,
" Quercus,
Odonestis potatoria,
Acronycta Aceris,
Ceropacha diluta,
Bryophila glandifera,
Leucania lithargyria,
" conigera,
" comma,
" inapura,
" pallens,
Apamea didyma,
" gemina,
Luperina testacea,
" infesta,
Triphæna orbona,
" Janthina,

Noctua umbrosa,
" baja,
" festiva,
Chersotis plecta,
Agrotis saucia, (*i. e.* if the insect appears this season as it did last)
" putris,
Anthocelis lunosa,
" pistacina,
Hadena adusta,
" oleracea,
" Pisi,
Euplexia lucipara,
Thyatira batis,
" derasa,
Calocampa exoleta,
Heliodes heliaca,
Plusia Iota,
Philopyra pyramidea,
" Tragopoginis,
Euclidia Mi,
" glyphica,
Pyrausta purpuralis,
Aglossa pinguinalis,
Scopula olivalis,
Metrocampa margaritaria,
Ourapteryx Sambucaria,
Ennomos illunaria,
Odontopera bidentaria,
Crocallis elinguaris,
Angerona Prunaria,
Halia Wavaria,
Fidonia atomaria,
Gnophos obscuraria,
Anaitis plagiaria,
Coremia didymaria,
" ferrugaria,
" propugnaria,
Thera simularia,
Steganolophia Ribesaria,
Harpalyce suffumaria,
" silacearia,
" Chenopodiaria,
" Pyraliaria,
" Popularia,
" Achatinaria,

Harpalyce russaria,
 „ immanaria,
 Ypsipetes elutaria,
 Phœsyle miaria,
 Cheimatobia autumnaria,
 „ brumaria,
 Phibalapteryx tersaria,
 Venilia macularia,
 Melanippe amnicularia,
 Emmelesia decoloraria,
 „ albularia,
 Zerene adustaria,
 Abraxas Ulmaria,
 Dosithea reversaria,
 Pœcilophasia marginaria,
 Timandra imitaria,
 Bradypetes amataria,
 Odezia Chærophyllaria.

Desiderata.

Colias Hyale,
 Thecla Betulæ,
 „ Pruni,
 „ W-album,
 Polyommatus Acis,
 „ Ægon,
 „ Adonis,
 Erebia Cassiope,
 Pamphila Actæon,
 Any of the Trochilium except
 Tipuliformis,
 Ægeria Apiformis,
 Sesia Fuciformis,
 Anthrocera Trifolii,
 Procris Globulariæ,
 Lithosia helveola,
 „ aureola,
 Liparis Salicis,
 Pœcilocampa Populi,
 Lasiocampa Trifolii,
 Petasia Cassinea,
 Ptilodontis Palpina,
 Notodonta camelina,
 „ dodonæa,
 Acronycta Ligustri,
 Ceropacha ridens,
 „ Or,
 „ flavicornis,

Cymatophora Oo,
 Stilbia anomala,
 Any of the Nonagriæ,
 Gortyna flavago,
 Rusina tenebrosa,
 Agrotis lunigera,
 „ fumosa,
 „ Tritici,
 Trachea piniperda,
 Polia dysodea,
 Hadenia lutulenta,
 „ Persicariæ,
 „ glauca,
 Cucullia Asteris,
 Micra ostrina,
 Hydrelia uncana.

— G. F. MATHEWS, *Raleigh House, Pilton, near Barnstaple*;
 January 29, 1857.

CAPTURES.

Vanessa Antiopa.—I send you the particulars of the capture of *Vanessa Antiopa* by me in the month of August last, should the same be worthy of notice for 'The Substitute.' I was strolling out on a fine Sunday morning, in the beginning of August, when my attention was directed to a most beautiful insect. Not having a net with me I cautiously advanced, hoping to secure it with my cap as it rested on a spray in a dry ditch by a hedge road, but before I could manage that away it went over the hedge, and after it I went, falling down on the other side; but again on my legs, not much the worse for my fall, and keeping my eye on the object of my pursuit, in a short time I came up to it. Another attempt, but no such luck, having missed it in striking. It again started with

increased swiftness, and I after it at the top of my speed, blowing fearfully and almost done, considering I had run a good quarter of a mile. I soon lost sight of it; but after an hour's search I again started my game, which again led me such a dance I shall never forget, but after three misses I made a hit, and you may judge my pleasure when I was informed it was a most perfect specimen of a British Camberwell Beauty.—A. RUSSELL, *Ashford, Kent*; January 31, 1857.

COMMUNICATIONS.

Vanessa Antiopa.—I have lately heard from a friend of mine who spent part of the summer at Weymouth, and on the 11th of August saw in a field near the town *Vanessa Antiopa*, which he and another gentleman who was with him pursued, but were unable to capture on account of its flying over a hedge, through which they were unable to pass.—HARDINGE W. BROWNE, 1, *Westbourne Street, Hyde Park Gardens*; January 31, 1857.

Arge Galathea.—On the 13th of August my friend went on an entomological excursion, and on arriving at the top of a hill in the vicinity of Preston he saw a great number of *Arge Galathea* flying in small masses over a portion of the hill, about 100 feet square, on which grew a peculiar sort of heath; beyond this space he only saw a few stragglers, which did not fly far from the main body, and although he went over a good bit of country that day he did not

see any more, which I think is a good instance of how extremely local they are.—ID.

Gonepteryx Rhamni.—I take this opportunity of mentioning one or two entomological facts which occurred to me this winter. About the end of December 1856, on one of the warm days we had at that time, I found amongst some brambles in Boundes Park, near Tunbridge Wells, a very fine female *Gonepteryx Rhamni* in perfect condition. Also, early in January, 1857, I found a male of the same insect in rather a dilapidated state. I think this rather proves that *Gonepteryx Rhamni* is not double-brooded; for, although the female was in perfect condition, yet at the time I found it, it could not have been just hatched from the pupa.—ID.

Killing Coleoptera and Lepidoptera.—Having been repeatedly requested by a nucleus of tyro entomologists to solicit your kind information to "How to kill, after capturing, Coleopterous and Lepidopterous insects?" I feel sure you will not refuse us a few lines upon this subject. The 'Manual,' 'Intelligencer,' and 'Substitute,' with Dallas' 'Elements of Entomology,' are all taken in and eagerly read, yet not a word can we find in any of them to furnish us with the information desired. The clumsy way in which our party kill the insects for the cabinet excites some antipathy to the Science, and therefore it becomes rather important that this should be obviated, and that no unpleasant feeling should, on the onset to the study, be excited. Perhaps you would spare a page or two in 'The Substitute'

to give us the desired information, as it would not only confer a favour on us but would most certainly render 'The Substitute' a paper of great importance to the young student.—T. JONES, *Lower Road, Islington; January 27, 1857.*

[Small Coleoptera should be placed when captured in a glass phial with a wide mouth, containing two or three laurel leaves cut into small pieces, where they speedily die. But as their limbs become rigid they should not be touched for a week or more, when all their joints will have become relaxed: then take them out, lay them on their backs, brush out their legs and antennæ with a camel-hair pencil, turn them over, touch them with the tip of the handle of your pencil, previously wetted, to which they will adhere, transfer them to a card gummed ready to receive them, and then set out the legs and antennæ. The method of making the gum is described in the 'Annual for 1855,' second edition. The bottle of laurel leaves must of course be tightly corked, and it will be an advantage to have a stout quill going through the centre of the cork, and having a projecting stopper of wood: this will obviate the necessity of taking out the cork every time you want to put in a small beetle. Large beetles may be killed by immersion in boiling water: they should be laid upon blotting-paper until dry, and then transferred to the laurel bottle until their limbs have become relaxed, when they may be gummed on to card or pinned through the right wing-case. Small Lepidoptera—*Tortrices* and

Tineæ—should be taken in pill-boxes, which should be placed in a jar, or canister having a tightly fitting lid, in which is a quantity of cut laurel leaves. The smallest genera, such as *Nepticula* and *Lithocolletis*, should be pinned and set out directly the insects are dead, say in half an hour; the others in twenty-four hours. Larger moths and the butterflies should be pierced on the under side of the thorax with a pen dipped in a solution of oxalic acid, which will kill them directly, and they should then be set out.]

A Manual of British Coleoptera.—I think a good Manual of British Coleoptera issued in parts, at a reasonable price, would be well received by entomologists generally, and that it would be well supported seems extremely probable, as there is nothing we stand so much in need of. I hope that it may be successfully and speedily carried out.—W. L. CONSTANTINE, 7, *St. Andrew Street, Blackburn; January 26, 1857.*

What's his 'Name?—I feel much obliged to Mr. Proh Pudor for telling me how to spell *Diphtheroides*, and was not aware that there is another *Noctua* of the same name till he pointed it out, but I fear it is too late to alter it, otherwise I should be glad to give it a new name, as I think with him that it is very objectionable to have two specific names alike in one family. I am not acquainted with the German language, and therefore should be further obliged to him if he would translate his quotation from Treitschke. Many of my brethren of the net are still in ignorance of the meaning of

the name as well as myself, and I have no doubt would also be glad to be enlightened.—N. COOKE, *Liverpool*; *January 31, 1857.*

The Testimonial to the Rev. Joseph Greene.—Permit me to remark that I altogether object, upon principle, to the proposed testimonial to the Rev. J. Greene. No one can be more sensible of the value of Mr. Greene's labours in Entomology than myself, but if

you once resolve to present pieces of plate to the authors of papers in our periodicals, where are you to begin and where to end? Among the writers on Entomology how many are there who have fairly earned such a mark of distinction! but who ever thought of repaying literary fame by silver candlesticks or candelabra? Surely the proposition is ill-judged.—CRITO.

Mr. Editor,—I have been greatly shocked at the ignorance displayed by your poet in the misapplication of names. I hope he is not the gentleman with the corns. I allude to the term bugfly: if he will use it, at least let him apply it properly, and not to the dubnoses, which are not bugs at all, poor things, but regular built beetles: surely their case is hard enough already without giving them nicknames. The real bugflies are the punaises, the Hemiptera, a class of insects which your exchanging contributors do not appear to deal in. However, as I think that entomologists ought to have a smattering of the whole, and not restrict their labours to the Brocades and the Bricks, the Festoons and the Daggers, the Emperors and the Chimney-sweeps, the Admirals and the Quakers, I have attempted a page or two of doggerel on the subject of bugflies, imitating as nearly as I can the efforts of your poet laureate.

HOW TO CLASSIFY THE BUGFLIES OR HEMIPTERA.

Place first all the bugflies proper,
 With their long and large antennæ
 Stretched out visibly before them;
 Fore wings always of two textures;
 Where they fit on to the body
 They are thick and tough like leather,
 But the tips are quite transparent,
 Thin and flexible and filmy,
 One laid on the other crosswise:
 All their legs are very simple,
 Formed for running, not for leaping,
 And their feet are all three-jointed.
 On the sap of plants they fatten,
 Sucking it with pointed rostrum;
 Oh, they smell so very nasty!
 Like the bug we find in houses,
 Even that's a bugfly proper,
 One whose wings are undeveloped:
 All are known as CIMICINA.

THE SUBSTITUTE.

Next them come the water walkers ;
 They all walk upon the water ;
 On each pond and stream you find them,
 Skimming safely on the surface,
 Safely as we tread the pathways,
 Without any chance of sinking :
 Their fore wings are long and narrow,
 Tough from end to end like leather,
 With their edges folded over ;
 All their feet, too, are three-jointed,
 And their body straight and narrow,
 Like a bit of stick just broken ;
 Water walkers, water runners,
 If you like HYDROMETRINA.

Following, and next in order,
 Though I rather would avoid them,
 Are those flat and ugly creatures,
 Crawling slow upon the bottom,
 On the muddy slimy bottom,
 Of the stagnant ponds and ditches,
 Feeding upon little fishes,
 Or the grubs of water insects :
 Their antennæ are quite hidden
 Underneath the poking forehead ;
 Their fore wings, like those of bugflies,
 Are of two distinctest textures,
 Tough and leathery next the body,
 Thin and quite transparent outwards,
 And there always folded crosswise ;
 All their feet are but two-jointed ;
 All their legs are formed for crawling,
 Not for leaping nor for swimming ;
 And their tail is two long bristles :
 Water scorpions I call them,
 Water scorpions or NEPINA.

Next to these the water boatmen
 Follow in the proper order :
 Their antennæ are quite hidden ;
 Their fore wings are of two textures,
 And are always folded crosswise,
 Just exactly as in bugflies,
 And their fore legs formed for grasping,
 All the rest are formed for swimming,
 And their feet are but two-jointed.
 Let us watch them in the water,
 In the bright transparent water,

On their backs for ever swimming ;
Don't they look the wrong way upwards ?
Yet their movements all are graceful :
I call them NOTONECTINA.

In the country that we live in
Skies are very often cloudy,
And the air is damp and chilly,
So we have but few Cicadas,
Merry songsters of the summer
Where the skies are blue and cloudless :
But these little jumping creatures,
Which we often call froghoppers,
Are the Englishman's Cicadas,
One alone indeed excepted,
One that sings in the New Forest ;
All the rest are mute as bugflies :
They have almost no antennæ,
Like the shortest finest bristles ;
Their fore wings are of one texture,
Very often quite transparent,
Sometimes coloured, sometimes clouded,
Sometimes thick and rather leathery,
Sometimes pied and gaily spotted,
But they meet together roof-like,
With straight edges, never crossing
Like the wings of water boatmen,
Which they very much resemble :
Their hind legs are formed for leaping,
And they leap with wondrous power,
Vaulting high but seldom flying ;
All their feet are but three-jointed :
I would call them all Cicadas,
But the English word froghopper,
Will do very well for England,
With its very small Cicadas,
Froghoppers or CICADINA.

Now we turn to lumpish insects,
Fixed like scales upon the branches
Of choice plants in hot stove-houses,
Often too upon our myrtles,
Very often on the apples,
And sometimes upon the hawthorn ;
These are always lady insects,
That thus stick upon the branches,
Scale-like insects or COCCINA.
Gladly I'd describe antennæ,

Wings, and feet, if I could find them,
 But from me these parts are hidden :
 Gentlemen are rarely met with,
 And 'tis said they are not scale-like,
 But have wings and long antennæ.

Lastly come the noisome plant-lice,
 Smother-flies the farmers call them,
 Smothering all the growth of summer,
 All the tender shoots of roses,
 Crowding till the shoots are hidden,
 Leaves and buds concealed by numbers,
 Anchored by their beaks sap-sucking,
 Winged and wingless all together ;
 Their antennæ long and waving,
 Gradual taper to the summit ;
 All their wings are quite transparent,
 When they have them, and not folded,
 But above their backs meet roof-like ;
 All their feet are but two-jointed,
 And their legs not formed for leaping :
 These are plant-lice, APHIDINA.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENEE'S NOCTUELITES.

[Continued from p. 191.]

Rusina.

This well-characterised genus is related to the *Caradrinidæ*, *Orthosidæ* and *Noctuidæ*. M. Boisduval has placed it in the *Amphypiridæ*. It appears to me to have least relation to these latter, especially in its earlier stages. The larvæ are somewhat inclined towards the first-named groups, and live almost like them and at the same periods: they are as lazy and their growth is as slow: they are full fed in the middle of winter, and change to chrysalis in the spring. The perfect insect ap-

pears in the middle of summer: it conceals itself amongst bushes, and flies even in mid-day when it is disturbed. (Vol. I., p. 255.)

Agrotis.

This genus has been remodelled many times since its creation, and always unsuccessfully, which arises from the extreme diversity of the species which compose it, and that under their three states, and also from the want of precise notices of many of their larvæ. The time will perhaps come when it can be divided into several very natural genera, but I have said, and still think, that that time has not yet arrived. I have therefore, left all the *Agrotis* in one single genus, and have satisfied myself with establishing divisions which appeared to me to be most natural.

These divisions are thirteen in number, and are themselves capable of being split up into subdivisions, sometimes tolerably defined, so great is the diversity of species in this complicated genus. Among the groups which deserve most attention, I would especially cite the third. Entirely composed of species from New Holland, which, by their simply pubescent antennæ, their flattened and very smooth thorax, their hairy and broad tibiæ, the anterior completely devoid of spines, and finally the protruding ovipositor of certain females, will probably some day be made to constitute a distinct genus, when the materials for its erection shall be more numerous.

The group 11, or *Spælotis* of M. Boisduval, has certainly also a peculiar aspect, but when I wanted to find real characters to make it recognised, I could not find a single one that was not common to some other species of *Agrotis*. That would have been even more difficult for my 12th group, which constitutes the genus *Chersotis* of the same author. Finally, his genus *Opigena* of the group 13th, though founded on more positive organic differences, has too much affinity with this same group 12, to be separated from it without inconvenience.

The larvæ of the true *Agrotis* are recognised at a glance: smooth, thick, the skin shining and of dirty colours, furnished with shining spots, raised and as though varnished, with the plates of the neck and anus equally shining, and of a very horny consistence: they resemble maggots

or larvæ of insects very unlike Lepidoptera. Their mode of life is also very peculiar: they are not content with hiding by day under the low plants, but they literally bury themselves in the earth among the roots, and when night arrives they often only project from this tomb the anterior portion of their body, strictly necessary to reach their food. It is to them especially that what I have said in the *généralité* of the family applies. Several of them are very injurious, especially on account of their numbers, and particularly *exclamationis*, *segetum*, *valligera*, *Tritici*, *aquilina*, *obelisca*, &c. One thing which happily diminishes their mischief is, that they attack almost indifferently all low plants, so that *Plantago*, *Alsine*, *Rumex*, *Taraxacum*, and the useless grasses support the greater number. Nevertheless they are very dangerous guests in our gardens. It even appears that in certain circumstances they attack plants of totally different families, and do not disdain to climb by night up woody plants. M. Treitschke speaks of ravages caused in 1833 and 1834 on the vines in the neighbourhood of Vienna by larvæ of *aquilina*, which devoured the leaves, the flowers, and the buds: but I have myself seen rose trees attacked by the larvæ of *segetum*.

[To be continued.]

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London: John Van Voorst, 1, Paternoster Row.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAINTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 18.] SATURDAY, FEBRUARY 21, 1857. [PRICE 2d.

SILENT LOVE.

THE 'Entomologist's Annual' for the present year contains an article entitled "Is Entomology progressing," in which is given a list of the contributors to the 'Transactions of the Entomological Society' for ten years, ending with 1855: and an analysis showing that the number of writers is increasing, and hence it is deduced that although the increase is small yet Entomology is progressing. We do not wish to controvert this position, we agree with the deduction, but at the same time we think the case is made to appear worse than it really is, because the publication in question does not contain the writings of all our entomological authors. There are several first-rate entomologists who have never contributed a line to the Entomological Society, and others who have given it very few papers,—why, we do not stop to enquire,—but who, nevertheless, have published valuable memoirs through other channels. It might be deemed invidious if we men-

tioned names, but so the fact is. Still it is undeniable that there are many men who have excellent practical knowledge of species who never write a word for publication: they have a silent love of their subject, and its science too very often, and yet their knowledge is not imparted to any but the select circle of their intimate acquaintance, through which a little of it, though changed and attenuated, may ultimately chance to find its way into print. And yet this knowledge of species, not derived from books but from the things themselves, is the best of all knowledge, because it is that upon which all other must be built. Now and then one of these silent lovers speaks out, and every one is surprised at the extent of his information, and wonders why he kept silent so long. This sort of reticence may arise in part from the natural modesty of the man, in part from the fear of not doing the thing completely, which we know haunts some—very needlessly we think, for no work in Natural History can ever be complete,—and in part from the fear

of hostile criticism. There is certainly good reason for the latter supposition, for entomologists, as a body, are a jealous and waspish race, given to sting and deficient in honey. So it should not be; but we believe many young students are deterred from publishing by the fear of being cut up. Let such take courage; they need fear no criticism if they will only master their subject; then whatever an individual may say, the worth of their matter will be appreciated by an audience that will judge for itself irrespective of any single person's dictum. To that the larger number of older entomologists who know so much, and yet keep the knowledge to themselves, or at most a select circle of friends, we would say that every consideration that should weigh with a naturalist calls upon them to communicate their learning by publication. It may be their stores of matter require to be systematised: this would be no difficult thing for them to do, and they themselves would be gainers by the process.

While, then, we should like to see an increase of writers on systematic Entomology, we, on the whole, demur to the conclusion that, on account of the paucity of writers, "either entomologists are not clever, or clever men do not become entomologists." We will

not quibble about the exact meaning attached to the word "clever," but according to our notion a man may be very clever and yet never put pen to paper; and we also believe that many entomologists are clever men who have not showed themselves—silent lovers who have yet to make their declaration. No doubt the paper in the 'Annual' is intended to put such persons on their mettle. May it succeed!

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

It is particularly requested that all Names of Insects may be written plainly and without abbreviation, and that they may be arranged in the order of any of the printed lists.

'THE SUBSTITUTE' will be continued for Twenty weeks, and will be forwarded weekly by post to Subscribers of Five Shillings, which amount may be sent in Postage-stamps to the Publisher. The Paper will always be ready on the Friday, and may be procured of KENT & CO., PATERNOSTER ROW, as well as of the Publisher.

Several communications only wait for room.

DUPLICATES AND DESIDERATA.

—

Lepidoptera.—I have duplicates of *Acronycta Aceris* in cocoon, fine.

Desiderata.

Thecla Pruni,
 „ W-album,
 Polyommatus Acis,
 Steropes Paniscus,
 Pamphila Actæon,
 Trochilium, any except *Ti-*
puliformis,
 Ægeria,
 Sesia,
 Lycæna dispar,
 Endromis versicolor,
 Zeuzera, any
 Notodonta dictæoides,
 „ tritophus,
 „ trepida,
 „ Chaonia,
 „ Dodonea,
 Gluphisia crenata,
 Clostera, any.

—J. J. REEVE, *Newhaven,*
Sussex; February 3, 1857.

Lepidoptera wanted.

GEOMETRÆ.

Phorodesma smaragdaria,
 Epione advenaria,
 Ennomos lunaria,
 „ illustraria,
 „ fuscantaria,
 „ Tiliaria,
 Aventia flexularia,
 Macaria alternaria,
 „ lituraria,
 Fidonia plumaria,
 Eupisteria carbonaria,
 „ quinquaria,
 Boarmia Abietaria,
 Cleora viduaria,
 Tephrosia Laricaria,
 Tephronia corticaria,

Parascotia fuliginaria,
 Anaitis præformaria,
 „ imbutaria,
 Eubolia mænaria,
 Coremia unidentaria,
 Thera firmaria,
 Anticlea sinuaria,
 „ Berberaria,
 Harpalyce picaria,
 „ Chenopodiaria,
 „ Pyraliaria,
 Ypsipetes elutaria,
 „ impluviaria,
 Cheimatobia autumnaria,
 „ filigrammaria,
 „ borearia,
 Lobophora hexapteraria,
 „ sexualisaria,

Duplicates.

GEOMETRÆ.

Phigalea pilosaria,
 Biston hirtaria,
 „ Betularia,
 Hemerophila abruptaria,
 Cleora Lichenaria,
 Tephrosia consonaria,
 „ crepuscularia,
 „ punctularia,
 Lozogramma petraria,
 „ lineolaria,
 Eubolia multistrigaria,
 Eusebia bipunctaria,
 Coremia erutaria,
 „ didymaria,
 „ Ligustraria,
 „ olivaria,
 Thera Juniperaria,
 Anticlea rubidaria,
 Harpalyce ruptaria,
 „ Galiaria,
 „ achatinaria,
 Cheimatobia brunaria,
 Triphosa dubitaria,
 Phibalapteryx tersaria,
 „ Vitalbaria,
 „ polygrammaria,

Camptogramma bilinearia,
 Melanippe hastaria,
 Zerene adustaria,
 „ albicillaria,
 „ rubiginaria,
 Bapta taminaria,
 Cabera exanthemaria,
 Ephyra punctaria,
 „ pendularia,
 „ omicronaria.

[To be continued.]

At the end of the Lepidoptera I intend to give a list of duplicates and desiderata of Coleoptera, Hymenoptera, Diptera, and Neuroptera, so as to make 'The Substitute' really what its name implies, 'The Entomological Exchange Facilitator.' It has been as yet the Lepidoptera Exchange Gazette.—H. J. HARDING, 1, York Street, Church Street, Shoreditch.

COMMUNICATIONS.

The proposed Testimonial to the Rev. J. Greene, M.A.—The note in 'The Substitute,' page 172, and on the cover of the 'Zoologist' for February, seem to ask for a word or two from me. The idea of a testimonial having originated with myself, and the form of such (viz., a silver trowel in suitable case, with a suitable inscription on the former,) meeting with the approbation of those to whom I mentioned it, I was next asked, "How should the thing be done, and sums got together for the purpose?" I proposed two methods, viz.—1st, the amount of expenses being ascertained, (the names of subscribers being weekly published in 'The Substitute,' but no

money paid pro tem.); this should be borne equally by all: or 2nd, that any amount of subscription should be acceptable, (see my note, 'Substitute,' page 172), and the overplus, if any, to be paid into the Hemmings family relief fund; subscribers and subscriptions, and the whole matter of expenditure, &c., of course to be published in 'The Substitute' and 'Zoologist.' Thus you have in a few words the origin and progress, in part, of the matter. I have in hand some subscriptions, some promised, and other communications on the subject. If the matter drop through, notice to that effect will be forwarded to you for publication, and subscriptions returned. If a more suitable mark of respect to Mr. Greene from his fellow entomologists can be suggested and carried into effect, I shall be most glad, and resign my part without a murmur. One word more I may be allowed to say, viz., that many more costly and larger gifts than a "Trowel" were thought of, but this seemed to be appropriate, and might be worthy a place over the cabinet and in the study of the Rev. gentleman.—J. JOHNSON, Denby Parsonage, Huddersfield; January 31, 1857.

Infra Dig.—Baillie Nicol Jarvie says "Siller slays mair souls than the sword does bodies." Will silver trowels slay more insects? for if so would it not be a good plan for every brother of the net to furnish himself with one, which he could present to his most intimate friend, and he in return could present the giver one back again? It also occurs to me that a great deal of money might be saved by getting them all made by one in-

dividual, and those who really feel inclined to go into the thing had better hand in their addresses to—
C. TEMPLI, *Penistone, near Huddersfield*; January 19, 1857.

Local Associations.—Perceiving in 'The Substitute' for January 24th your remarks upon Local Associations, I am extremely anxious to hear the advice you will give to a few whom you fitly denominate as "brothers of the net and pin," who are endeavouring to act upon your remarks by forming an Entomological Society in York, agreeing with your leading article that the rules should be as few and simple as possible. Hoping that I do not encroach too much upon your valuable time, and in order to give you a better insight into the manner we intend to manage the Society, I have added a sketch of the regulations which we are thinking of adopting, and if you could assist us by making any amendments you will much oblige. *Rules.*—1. That the meetings in connection with the society shall be held at "The Bay Horse," Gillygate, where the attendance of the members is particularly requested. 2. The annual meeting will be held on the 1st of April, when officers shall be elected for the ensuing year, viz., a president, a vice-president, and a committee of seven; also a treasurer and secretary. 3. The monthly meetings shall be held the first Monday in each month, at eight o'clock in the evening, when the members shall be at liberty to discuss the proceedings of the society, and to exhibit any specimens which they think will interest the meeting, or make any remarks which will be of use to the

society. 4. Whenever necessary the committee meetings shall be held at the conclusion of the member's meeting, when all necessary business in connection with the society can be transacted amongst the committee. 5. There shall be a monthly payment of sixpence, which shall be paid at the commencement of each monthly meeting; and if any member omits to pay for three successive months his name shall be erased from the list. 6. If a member leaves the society, but wishes to re-enter it before six months have past, he shall be required to pay what is due previously to again joining the society. 7. There shall be a library in connection with the society, and each member can withdraw one book each week, which he shall be allowed to retain for that period. 8. The money belonging to the society shall be used to provide works for the instruction of the members, which works shall be added to the library. 9. The members are expected to use their best endeavours in aiding each other in the prosecution of their researches; and if any of them have duplicates of certain sorts, which other members are wanting, it is also expected that a preference will be shown to those belonging to the society by supplying their cabinets before assisting those who have no connection. —ROBERT ANDERSON, *St. Martin's-le-Grand, Coney Street, York*; February 6, 1857.

[We see no objection to these rules, except that which provides that the meetings should be held at a public-house, which should, if possible, be amended. There

is also no mention of the manner in which members are to be proposed and elected, which matters we think should be incorporated.]

The owre true History of a Brood of Cerura Vinula.—May 30, 1855, saw some large moth sailing on the wings of the wind, and its own also looming in the distance and coming towards us: net presented, struck, and caught it; and by all that's lovely a *Vinula*: put it in a box; and after a good catch at sugar retraced our steps, and arrived at home all anxiety about the lovely captive: looked in the box and found puss at rest, and surrounded by convex nut-coloured shining buttons, that we saw were ova: counted them, and found they numbered fifty-eight: next morning found the number had increased to 147. She lived three days, then battered herself to pieces, and seemed to expire in a kind of ecstasy. Counted the ova once more, and found that I was the possessor of 187. June 15, I discovered that the incubation was complete, and a troop of little brown animated things, like so many lilliputian kittens, wig-wagging their tails, and evidently in search of that which was not to be found. However, I soon satisfied them by putting some "green willow" before them, and had the pleasing satisfaction of seeing they were an approving company of little fellows, and like all good boys ate what was set before them. Changed the food daily (for the first fortnight), and on the sixth day I found they refused to eat, and were in a kind of trance, as they were motionless from three to five days, when I observed

some of them in the throes of labour: felt interested, and noticed one of them burst the skin near the head, and by degrees out came a little rascal with a smarter suit, of brighter colour, and like the fashionables of the day, a stripe down the sides of a yellowish-green, but not continuous, rather broken in the middle: they all moulted, but with a variation of time, as some of them were stoutish fellows when their brethren were emerging from the first skin. I found they were from three to four days and a half in changing, according to the more vigorous vitality some of them were endowed with. On the eighth day from the last change I noticed the same dormancy evidently oppressing them, but prior to which I observed them fabricating a carpet of white silk to rest upon, with their large elephant-like legs affixed thereto, and the other six elevated in a conceited attitude, like so many little dogs begging. After the second moult (I found that I was minus some thirty-seven) the saddle on the back was brown speckled with white and a narrow edge of white, and the stripe of brighter green: some of them decidedly unsocial in disposition, as some found out to their cost. I noticed some of them that wished to dine out meet with very scurvy treatment, as they were bitten on the hump by the lord of the manor, and from the puncture there issued a greenish fluid, and a gradual wasting of the system ensued, so that I found the poor fellows at the bottom of the box in a dying state, victims to the offended dignity of fratricidal brethren, and melancholy exam-

ples to all uninvited guests. On the twenty-fourth day a great number had got into the third moult; one poor fellow was looking poorly, saw him fall from the spray; I lifted him up, he held on a little with his pro-legs, then reeled over and fell again; noticed a contraction at the sides as if drawn in by spasms, then a vomiting and purging ensued, and the body of a blackish colour (likened the symptoms to cholera), and the poor fellow was reduced to half his normal size, and at last I found him a blackened corpse. I tried to find out the cause, (as a great number had died in the same way, and I was fearful that I should lose them all), but without effect until some days after, and I attribute it to the following. In changing the food I threw the skins of some of them away, and then I recollected that after emerging from the old skin they invariably ate them, as I had often seen them do, and merely thought they were not choice in their selection, but alas! it was not so, as I found out to my cost, and that the cannibal propensity they manifested was requisite for the creatures well-doing, and was part of the economy of insect life (or rather of pussés): noticed some others unwell, and symptomatic of a like termination, a contraction in the region of the stomach with vomiting and purging, and at last death put an end to their sufferings: resolved to make some experiments to test the validity of the theory I had formed. I placed six of them in separate boxes before casting their skins for the last time, three of which I took away as soon as they had moulted; they

seemed uneasy, and evidently in search of something, as they crawled about the leaf: saw the three which were left to themselves eat their old jackets, and then rest for some hours; they invariably began with the tail sheath, and ate all but the head-case; that they rubbed off in the manner birds clean their bills: they all began to eat and looked well for some time, until nearly full grown. I then noticed two of the first three looking dingy, the muscular contractions, &c., ensued, and then they died. The second three and the last of the others, however, did not manifest any signs of illness, but some days after I observed them all four looking different, the colours altering, and felt afraid that I was going to lose them all, as they refused to eat, but more active than I had seen others that were struck; I was pleased, however, to see that they had only been looking out for an eligible site whereon to construct their winter habitation, as they all four began to spin, and very active they were when the sun was shining on them, (and, by the way, with what vigour they eat under the same circumstances, puss larvæ, and all others that I have kept, three bites to one as compared with what they do in the shade), fabricating their oval cocoons, and before night they were hid from view, but I could see they were busy upholstering, and heard them nibbling the box like mice, and covering the roof with the particles, all but one spot about an inch and a half in diameter, which was left clear like horn, (and which is softened by the crystal fluid that they eject

from between their eyes when they are emerging from the pupa.) After being made up some days I wished to see if they had changed into pupæ: I took a penknife and carefully cut the top off the cocoon, but they did not approve of such burglarious treatment, as they began to remedy the evil by making up the aperture by smearing the edges, (not weaving it as aforetime), until all was snug again. In a fortnight or so I again cut the top, and the three that I left to Nature had changed to pupæ, and strong and healthy they looked as they wriggled in their cots; but the last of those I experimented on I found a mass of putrid matter. I therefore felt convinced that I was right in my conjecture that the skin was requisite for the well-doing of the larvæ, which I again proved in 1856. And to finish the lamentable history, I may briefly say that out of 180 larvæ I only got 11 good specimens of the perfect insect.—J. A. WASSE, 26, *Upper Brook Street, Manchester.*

Melitæa Cinxia and *Agrotis saucia*.—Seeing so much in 'The Substitute' at pages 130 and 132 of the prodigious capture of *Melitæa Cinxia* in the Isle of Wight, and its irregular appearance, and being the person alluded to, I may be able to elucidate the circumstance. I commenced taking this species about the end of May, and continued till the middle of July, numbering something more than 300 specimens, and it must be understood that the undercliff is considerably later than any part of its coast (that is in its insect productions). With respect to *Agrotis saucia* I took it at a much

later period (50 specimens) than that of its regular occurrence in other parts of the coast, which specimens I forwarded for exhibition at the Northern Entomological Society's Meeting in October last.—EDWARD SMITH, *Turkey Street, Worcester; February 4, 1857.*

Acronycta Salicis not a distinct species.—At page 7 of 'The Substitute' I state that I believe *A. Salicis* to be only a variety of *Rumicis*. This statement brought me a reply from J. C. Dale, Esq., which induced me to send him my specimens for examination, and it turns out that the *Salicis* of our Northern collections is not the *Salicis* of Curtis. As I saw similar specimens to mine in collections in this neighbourhood before commencing my present collection, I took it for granted that ours was the *Salicis* of Curtis, or I should not have made the above-named statement. Mr. Dale says with good reason that if *Salicis* is a variety at all, it is a variety of *Menyanthidis*; that he was with Curtis at the time he found the larvæ from which they were bred; that he also found three larvæ, and reared one moth exactly like Curtis's figure of *Salicis*. Curtis was more fortunate and bred several, and one *Menyanthidis* amongst them which puzzled him. The larvæ were found on sallows at the Trossachs, and they had no other larvæ. The figure Curtis gives was drawn at the time at the inn at Trossachs. Mr. Dale thinks the only way to settle the question is for some one to go to the Trossachs and take the larvæ, but I feel sure that you will all agree with me in say-

ing there is no necessity for that, as the figure before-mentioned is a beautiful and exact representation of the larvæ of *Menyanthidis*. And I shall conclude by saying that I am not sorry I made that erroneous statement in 'The Substitute,' as it has drawn forth this information, proving Guenée to be right in stating that the figure given by Curtis of the larva by the side of the imago is sufficient evidence that this *Salicis* is only a variety of *Menyanthidis*. [Read before a meeting of the Northern Entomological Society on the 10th January, 1857].—N. COOKE, 6, *Wentworth Street, Everton, Liverpool*.

THE OXFORD UNIVERSITY ENTOMOLOGICAL SOCIETY.

The second meeting of the Society this Term took place on Tuesday, the 10th inst.

After the donations which had been received since the last meeting had been announced, an exhibition was made of a singular variety of *Argynnis Paphia*.

The Rev. H. A. Pickard then read a paper on the origin and meaning of the scientific names given to many of the diurnal Lepidoptera; and Mr. Matthews read a similar paper on the names of some of the Heterocera.

Some discussion then ensued with regard to the derivation of some names which appeared to be shrouded in mystery.

Several new members were subsequently elected, and the meeting adjourned to Tuesday, the 24th inst.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENÉE'S NOCTUELITES.

[Continued from p 203.]

Agrotis (continued).

In the perfect state the insects of this genus are very recognizable: they keep their wings almost parallel to the surface on which they rest, and the inner margins of the anterior wings overlap, so that the animal has a very elongate form, which it completely loses when its wings are fully extended: they fly with great vivacity at dusk, and even some of them during the day. *Agrotis segetum* and *exclamationis* are so common in some localities that you may take ten of them for one of any other sort of *Noctua*: this is a true nuisance for the entomologist at dusk. This numerous genus is rather difficult to unravel, for certain species vary almost *ad infinitum*. The females only differ from the males by the abdomen, the antennæ (in the species where they are ciliated), and by the always darker colour of the posterior wings. (Vol. I., pp. 257—259).

Triphæna.

A very marked family-resemblance prevails in this genus, which has been adopted by all entomologists; but we must not therefore conclude that there are no groups to be established in it: on the contrary, they are more numerous than in many genera which appear less homogeneous at the first glance. Thus, *pronuba* has an *Agrotiform* appearance: its

larva is more earthy, more shining, and more concealed than all the others. The perfect insect has the anterior tibiæ spiny, the frontal tuft prolonged, the palpi raised to its level and forming with it a sort of beak; their second joint very securiform; the posterior wings broader and more folded than the others. *Janthina* is more velvety, with the wings and even the thorax scaly, the collar always of two colours, the front rounded and little projecting, the palpi almost straight; the second joint unicolorous, simply squared at the top; the anterior tibiæ not spiny: it flies during the day with extreme vivacity. *Fimbria* is more elongate than any other; the palpi short; the second joint swollen exteriorly; it has only spines on the middle and hinder tibiæ; its abdomen is shorter, more depressed, more hollow; its posterior wings, as velvety as the anterior, have a border of a disproportionate breadth. *Interjecta* comes from a larva almost similar to one of the *Leucaniæ* in colour and marking, devoid of the cuneiform spots. The perfect insect has all the tibiæ entirely without spines. Finally, *orbona*, *subsequa*, and *consequa*, form a principal group, of which the chief characters are, that the larvæ are very attenuated anteriorly; the palpi with the second joint unicolorous, securiform, with the outer angle sharp, the third joint hardly visible and truncate, and all the tibiæ spiny.

From this we see how genera which are the most homogeneous and the least disputed are liable to be split up if we examine their characters one by one, and this

example is well fitted to induce us to be indulgent to those who declare they only proceed in Entomology with the glass and dissecting-knife in hand, and who only declaim unceasingly against the vagueness and slight degree of permanence of our characters from the want of having experimented with their own, which would fare no better if compared with more general observations.

The genus *Triphæna* occurs throughout Europe, but I know of no exotic species. The larvæ are nearly allied to those of *Noctua*, and do not require a particular description; they are hatched in the autumn, and as they feed on a multitude of low plants, they find something to eat throughout the winter, and are full fed in the beginning of spring. One of them (*pronuba*) is a veritable pest for our gardens; it attacks almost all vegetables, devouring in preference the heart, and as it is very voracious the havoc it makes is great; gardeners commonly find its chrysalis when digging the borders, along with that of *Agrotis exclamationis*, which is hardly less injurious: this is almost the only means of destroying a few, for the two species live too well concealed to render the search a useful employment of time in a horticultural point of view.

The perfect insects have, like the *Agrotis*, the habit of crossing the anterior wings one upon the other, which gives them a very elongated form; in general they have great muscular force, and fly with vigour when disturbed, but this flight is of short duration. *Janthina* flies from five to six in

the evening; the others fly at dusk. The *Triphænæ* are never sluggish like the *Hadenidæ* or the *Orthosidæ*, and when we wish to seize them they slide rapidly from beneath the fingers instead of remaining motionless under the pin which threatens them; indeed all the *Noctuæ* of which the anterior wings are not sloping are generally more lively and more difficult to catch than those of which the wings are deflected. (Vol. I., pp. 315—317.)

Noctua.

It is to this genus that the ancient Linnean name remains, and all entomologists have long been agreed on this point, but its composition has varied, and species of the ancient genera *Orthosia* and *Agrotis* have been successively admitted and removed; latterly it had become nearly settled, but an innovation of the English authors had been generally adopted; this consisted of forming a genus to itself of *Xanthographa*, which Mr. Stephens had removed from *Mythimna* of Ochsenheimer, but after due consideration this species did not appear to me to differ generically from the true *Noctua*, and I restore it here.

It will be seen that I have divided the genus *Noctua* into nine groups, which do not differ less from one another than those which I have established in the genus *Agrotis*, but which are inevitably linked together. I will cite as the most striking group 1, composed of species of grey colour, with the black marks more or less distinct: group 3, which

forms a portion of M. Boisduval's genus *Chersotis*, and of which the anterior wings are dull red edged with a white costal streak: group 5, in which the males have the antennæ strongly ciliated: group 7, of which the first section has no spines on the anterior tibiæ, and the second section only has them on the intermediate legs, though these species otherwise resemble the other *Noctuæ*: group 8, which has hitherto formed a portion of *Orthosia*, but which has all the characters of this genus: and finally, group 10 or *Xanthographa*.

The larvæ of *Noctua* have nothing vermiform about them; they are thick, cylindrical, entirely smooth, velvety, generally marked with rather pretty patterns, but rarely of a green colour, the spiracular line is always very visible, and the subdorsal lines are frequently surrounded by black spots, which on the twelfth segment are wedge-shaped as in *Triphæna*. These larvæ all live exclusively on low plants, under which they are concealed during the day, but without burying themselves in the earth, and never feeding on the roots; they generally pass the entire winter in this stage, and do not go into the ground to change to chrysalis till the spring; they appear in the perfect state towards the middle of summer, or more rarely in autumn.

Arrived at the perfect state, the *Noctuæ* resume their relationship with *Agrotis*; some of them imitate this genus in markings, and all share the manners and habits of the species. (Vol. I., p. 322.)

[To be continued.]

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THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAINTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, on or before March 20, 1857.

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THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 19.] SATURDAY, FEBRUARY 28, 1857. [PRICE 2d.

THE ENTENTE CORDIALE.

EVERY one knows the old fable of the bundle of sticks—strong when united, weak when divided. This is the moral we have tried to impress upon our readers with regard to their pursuit of Entomology, and we would fain address to them a few lines more on the same subject. It is not enough that Societies and Clubs are established for the encouragement of Entomology, their members must give up selfishness, and think more of others than themselves, ere they can reap the full benefits of such associations. Not only must the collectors of any particular Order of insects be willing to assist other collectors of the same Order, but they should extend their sympathy to the students of all other Orders. The want of this sympathy seems to us to be rather on the increase; at any rate there is too much isolation among entomologists; they are divided not only into Coleopterists, Lepidopterists, &c., but these again

are split up into little cliques, either with reference to the subjects of their attention or the leaders whom they follow, and so there is danger that eventually they may not deserve the name of "Entomologists" at all. This is a rock a-head of which we would give warning. We believe it to be a necessity that each of us should have a special range of insects for his study, but with all due attention to the attraction we should give heed to the fact that *it* constitutes but an integral part of Nature, and the insects to which other persons have devoted their attention are equally valuable in a scientific point of view. Regard being had to this consideration, we think that we might render more assistance to each other than we do, and cultivate a more cordial understanding with collectors in general.

For instance, how often does an insect, or a fact, in its economy fall under the notice of one who does not collect the Order to which the insect in question belongs; he takes no notice of it and the matter is lost, whereas if he had noted

the circumstance or captured the insect, some friend who could appreciate its value might have been supplied with a new fact in insect-history or a new species. This sort of opportunity, we fancy, often happens, for a hunter after one Order or Division of insects frequents localities little or never visited by the collector of other insects, and so meets with rarities which he neither knows nor esteems. Of course it would be better that all collectors should have so much general knowledge as, without distracting their attention from specialities, would enable them to distinguish a fact or an insect if out of the common way; but this is scarcely to be hoped for, and yet we are persuaded that many a bit of knowledge and many a good species may be picked up in a desultory way if collectors will keep their eyes and their hearts open. We once knew a collector of almost all Orders except *Lepidoptera*, but in the course of his wanderings he had casually pinned a dozen or two of small moths, and the majority of these, upon examination by a competent person, proved to be great rarities. We have all read in last year's 'Annual' how *Trochilium Chrysidiforme*, *rarisima avis*, was swept up by a Coleopterist who did not know it nor want it, and yet did *not* throw it

away. Other similar instances are not wanting. But on the other hand, how many Coleoptera have been turned up by diggers for the pupæ of *Lepidoptera*? how many rare beetles have come to the sugar baits of moth-catchers? how many pupæ of *Lepidoptera* have been found by hunters for beetles in moss? how many parasites have been reared from Lepidopterous larvæ? and all lost to the respective parties they would have delighted and benefited.

Captain Cox recently alluded to the mutual advantage entomologists are to each other, and has mentioned some of the above subjects. We agree that to a certain extent entomologists do assist each other, but we wish to see the desire to benefit others in the way we have mentioned become more general, and we think well enough of the brotherhood to believe that a great many only require to have their attention called to the matter for them to practise it.

There will be exceptions, no doubt—there are to the best of causes. Well, let Diogenes have his tub to himself, and let us not forget to stand out of his sunshine: with other and better natures we may cultivate the *entente cordiale*, encouraged thereto, if need be, by knowing that it will be quite as much for our own benefit as theirs.

TO CORRESPONDENTS.

All communications to be authenticated by the name of the writer, and to be addressed TO THE EDITOR OF 'THE SUBSTITUTE,' 9, DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON, N.E.

B. B.—We cannot answer your question positively, but we believe all cedar wood is liable to the same objection.

G. G.—Your application is under consideration.

COMMUNICATIONS.

Exchanges with Foreign Entomologists.—[We have had handed to us the following extract from a letter from M. E. Fologne, of Brussels. We are happy in thinking that we have been the means of inducing a correspondence with this gentleman, and hope that such communications may become more frequent between British entomologists and their continental brethren.]—"I beg to thank you for the service you have rendered me by inserting my letter in 'The Substitute.' I am now in communication with several entomologists in different parts of England, and I have already enriched my collection with several species. I have even received so many offers of Lepidoptera in exchange that I am unable at present to satisfy all demands."

The Testimonial to the Rev. J. Greene.—Sir,—When it is pro-

posed to confer honour upon any person not wholly undeserving of it, the "ayes" are pretty sure to carry the day; for if there be any who dissent from the proposition, the feeling that it would be ungracious to appear to detract from acknowledged merit generally stops their mouths. Now, sir, one of the features which characterise the present state of society is a rage for testimonials. Any one who has been supposed to do his duty, or to confer benefit on a greater or less portion of his fellow-creatures, must needs be presented with a testimonial. Even were this literally the case,—were the most deserving men always selected,—will you allow me to suggest that the principle is an utterly wrong one? It is part and parcel of that system of doing good, and being good, *for the sake of reward*, which is the bane of so much of our secular and theological teaching now-a-days. And yet virtue, in whatever line, is surely its own best reward. Surely no testimonial ever conveyed a pleasure equal to the conscious pride of having done good and helped others, and being indebted to no man. There are many periods in a man's life in which he has good reason to exclaim, "Save me from my friends!" Those who get up testimonials on every possible occasion little think how they often give real pain to those whom they delight to honour. The feeling that the proposition is inappropriate,—one's own merit really undeserving of such pre-eminent recognition,—on the one side, and the fear of being ungracious or unkind on the other, are anything but agreeable to a sensitive mind.

I do not entirely depreciate the custom of testimonials: in certain cases they are right and proper. But is the present case one in point? Here is a patient and accurate naturalist who has specially turned his attention to a much neglected method of collecting insects: he has thus obtained many rarities, and splendid specimens for his own cabinet: his liberality in distributing his duplicates has gained him the good word of every entomologist. He has also done what every one ought to do under similar circumstances; he has published a full description of his *modus operandi*. By this, no doubt, hundreds of collectors will make great profit; what special benefit will accrue to Science remains to be seen. Now, has not this gentleman's discovery been its own reward? He has the satisfaction of knowing that he has helped others. Why alloy that satisfaction with anything that can diminish the feeling of independence, or impose that of obligation? And again, how does his case differ from those who have of late years originated the various "dodges" of *sugar*, *sallow* and *ivy blossoms*, *street lamps*, and the many other new methods of taking insects? Why should *pupa-digging* be specially honoured above all these. But surely, sir, testimonials in connection with scientific objects should be given, at all events, *first* of all to those who have materially aided the progress of *scientific truth*; to those whose labours have added the most to our acquaintance with the real domestic history of the various works of Creation. One could easily men-

tion many such names; but they are quiet, unobtrusive ones; hardly thought of by "the many" who care little for science and the common good, but much for what immediately affects their own individual interests. Suffer me to add that I have not the slightest acquaintance of any kind with any persons to whom I have alluded. I fear I may have trodden on many a "corn:" if so, I humbly beg pardon of the possessors of those uncomfortable excrescences.—REV. P. H. NEWNHAM, *Woodbridge Road, Gûildford*.

The Fund for the Family of the late Mr. Hemmings.—I am much concerned at the death of our friend J. Hemmings, but being a poor man I can only assist the fund for his family in this way: I have six pairs of *Speranza conspicuaria* which I took at Raydon Wood, and which I will sell for 2s. 6d. per pair, 6d. to be sent to me for postage, and 2s. to the committee.—GEORGE KING (of Ipswich), *Priory House, Weymouth*; February 13, 1857.

Diphthera Orion.—In 1853 I took about 120 of this moth at sugar in a wood near Ipswich, and noticed always that they rarely came until between ten and twelve o'clock, and that they were more abundant when the nights were dark and windy: once I got twenty-seven and once twenty-five, but on unfavourable nights not one. They never fed for any length of time, were very shy, and were easily disturbed by the light of my lantern.—ID.

The Case of Egger versus Hornet.—A few years since I found a cocoon; size about that of the Small Egger; shape almost a

parallelogram ; consistence rather thin, but tough ; colour purplish chocolate ; time, early spring ; situation in a damp meadow, near Harleston, Norfolk, on the foot of a stunted willow where the ground had parted from the tree : I cut it off (*i.e.* the cocoon) and put it into a breeding-cage. The query is, what came out of it ? I say a hornet, as I found one in the breeding-cage one morning, evidently just out from somewhere, and I then found the cocoon open and nothing in it ; there was no moth that could have come out of that cocoon in the cage that morning (I used to examine the cage every morning). I sent the hornet to Mr. Wailes, of Newcastle ; he has pronounced it a female, but said he never knew or heard of a hornet making a cocoon and laying up in it, and thinks there must be some mistake, and Mr. Unwin seems to think so too ; but not feeling satisfied about that I make it public in the hope that some light may be thrown upon it. — J. J. REEVE, *Newhaven, Sussex ; February 3, 1857.*

Rev. J. Greene's Essay. — I should like most respectfully to suggest that if the Rev. J. Greene would publish his excellent Instructions for Pupa Hunting in a separate and cheap form (say 3d.), it would be a great boon to many, who will otherwise never see them, and think many would buy them in that form, who either have already read them or have them by them, and the more especially if the best methods of preserving the pupæ were added. — ID.

Cynthia Cardui. — I have been waiting since January 10th last

(No. 12 of 'Substitute') in the hope of seeing a reply to the query of S. C. T. Beale, Esq., as to the uncertain appearance of this pretty butterfly. Some few years ago I met with a large number of them at one time, of which I sent an account to 'The Naturalist,' but have not seen one since. — JOHN GARLAND, F.L.S., &c., *Dorchester ; February 7, 1857.*

The "Burning Cliff," Dorsetshire. — I have noticed on one or two occasions (*vide* 'Manual' for instance, Art. *Actæon*) the terms "Burning Cliff" and "Lulworth Cove" applied somewhat indiscriminately to *Actæon's locale*, as if synonymous for one and the same place. Will you kindly allow me to rectify (I should rather say explain) this slight error, as I think it may mislead strangers ? The "Cliff" and the "Cove" are two distinct places, both situated along the coast, but the "Cliff" five miles nearer Weymouth than the "Cove." Though I have often made entomological excursions to Lulworth (and it is an excellent locality for many species) I have never met with one *Actæon* there ; indeed, I fancied they had quite deserted their "first love," until I saw from a communication in 'The Substitute' (page 19) that they had reappeared there. At the "Burning Cliff," however, which is, without doubt, their "Metropolis," they revel in hundreds, and I advise any entomologist who wants *Actæon* and does not mind tumbles over a "humpy" undercliff, to seek them there. I mention this as I know that several entomologists, who come for the express purpose of procuring the insect,

go away disappointed at their want of success, and this because the name of the insect directs them to Lulworth instead of to the

“Burning Cliff” where, no doubt, they would find it in plenty.—A. PRETOR, *Harrow; February 12, 1857.*

Sir,—I am surprised at your publishing those lines, I will not call them verses, about the Hemiptera; they are as dull as the ditches where your correspondent finds his *Nepina*, which, to say truth, are not worth writing about. Imitation forsooth! Where is the preamble, the peroration? Where the prologue and epilogue in which I so gracefully introduced the infant daughter of the Douglas? a delicate compliment he will not forget when he is naming his novelties, for I sent him my card, in strict confidence, with a copy of the verses. Here are some more verses, a large batch; and I hope you will certify my entire repudiation of the Hemiptera nonsense.

THE HYMENOPTERA DESCRIBED.

Child of Douglas, Pauline Zeller,
Youngest daughter of the poet,
He who writ ‘The World of Insects,’
Writ in prose a pleasant poem,
Let me tell thee of the sawflies,
Of the gallflies and ichneumons,
Of the rubywasps and sandwasps,
Of the bees and wasps and pismires,
As I told thy sister Laura,
All about the tribes of beetles.

In describing all the inas
Of these four-winged, clear-winged insects,
I must tell you of their larvæ,
Where they live and what they feed on.

First a tribe of caterpillars,
As of butterflies and nightmoths,
Living in the woods and hedges,
On the juicy green leaves feeding,
And resembling, too, the larvæ
Of the butterflies and nightmoths
In the art of spinning cases,
Inside which they change to pupæ.
When the sawfly—these are sawflies—
When the sawfly once emerges
From these silken gluey cases,
And you look at its antennæ
For some mark whereby to know it,

You will fail, they are so varied ;
 Some are knobbed, and some are threadlike,
 Some are forked, and some are fanlike :
 All have four wings, clear and glittering,
 And a thick and fleshy body,
 Uniform throughout in thickness,
 Not nipped in and spindle-waisted,
 Like a wasp or like a spider :
 They have all the feet five-jointed,
 Fore shanks, two-spurred at the summit ;
 One sex only bears a weapon
 Near the tail, beneath the body,
 Sharply notched and very saw-like,
 And with this she quickly pierces
 A young leaf or juicy sucker,
 And her eggs sedately places
 In the wound she has created ;
 From this saw we call them sawflies,
 Sawflies or TENTHREDININA.

Next a tribe with footless larvæ,
 White, and fat, and stupid maggots,
 On the solid timber feeding,
 Burrowing deep into its substance,
 Leaving galleries behind them :
 They have long and thin antennæ,
 Gently tapering to the summit,
 Wings transparent, and loud humming,
 Fore shanks one-spurred at the summit,
 And the feet are all five-jointed ;
 Body uniformly rounded,
 Not nipped in and slender-waisted,
 And the tail is like an augur,
 Formed for boring into timber ;
 If you ask me wherefore boring,
 What its use and what its object,
 I should quickly give this reason,
 That the fly may safe deposit
 Eggs in every excavation,
 Eggs from which the infant larvæ
 Soon emerging bore still deeper,
 Deeper still into the timber :
 Let us call them SIRICINA.

All the oakapples and inkgalls,
 All the cherrygalls and nutgalls,
 All the bitter Dead Sea apples,
 All the beautiful oakspangles,

And those freaks of sportive nature,
 Called by children wild mossroses,
 Found in summer in the hedgerows,
 All these and a hundred others
 Quite as strange, and some far stranger,
 Are the work of puny insects,
 That we always call the gallflies,
 Or in Science CYNIPSINA.
 These most wonderful formations
 Nurseries of gallfly larvæ,
 Little white and footless maggots,
 Are not built by skill instinctive
 Of the quiet penned-up inmate,
 Or its winged and wandering parent;
 But are merely strange distortions,
 Caused by buoyant sap diverted
 From the true and proper channels;
 Yet how uniformly fashioned!
 How alike in size and figure
 Those each kind of fly produces!
 How unlike to every other!
 All the gallflies are small insects,
 With antennæ very simple,
 And with bodies flattened sideways,
 And divided in the middle
 Into nearly equal portions,
 Called the abdomen and thorax;
 And the female has a borer—
 Almost all gallflies are female—
 With which instrument she pierces
 Leaves or tiny twiglike branches,
 Laying eggs within the fissure;
 The clear wings are almost rayless,
 And her feet are all five-jointed.

Next to gallflies come ichneumons,
 Insect-parasites we call them,
 For the grubs or footless maggots,
 From which come the fly ichneumons,
 Live concealed within the bodies
 Of all other kinds of insects,
 But in caterpillars chiefly
 Of the butterflies and nightmoths:
 On the living flesh they fatten.
 When the time arrives for changing,
 When the butterfly should issue
 From its still and death-like pupa,
 Then from out that shrouded coffin

Comes the parasite ichneumon,
 With its long antennæ quiv'ring,
 With its wings all bright and shiv'ring,
 Quite transparent, often tinted
 Like the evanescent rainbow :
 They are insects slender-waisted,
 And their tail is armed with bristles,
 Three long, sharp, and piercing bristles,
 Which they plunge into their victims,
 And then leave an egg within them :
 Most of them have feet five-jointed,
 But a few, minute and burnished,
 Like winged gems so bright their colours,
 Have the feet four and three-jointed.
 All the tribe we call ichneumons,
 Parasites, ICHNEUMONINA.

Next the rubywasps invite us,
 Clad in mail of gorgeous colours ;
 Blue and green, carmine and purple,
 Gliding over walls or palings ;
 Who is there that has not watched them,
 As with vibrating antennæ
 They inspect each crack and cranny,
 Seeking out the nests of wallwasps,
 Masonbees, or bees that build in
 Posts or mortared walls, or sandbanks,
 Forming there the cosy dwellings,
 Dwellings for their future young ones ?
 When these dwellings she discovers
 The sly rubywasp deposits
 All her eggs among the larvæ,
 With a weapon telescopic-
 Fashioned, joint in joint retractile,
 And her young, when hatched, devour up
 All the food that was provided
 For the young of bees and wallwasps :
 Let us call them CHRYSIDINA,
 Rubywasps, or Chrysidina.
 Their antennæ short and elbowed,
 Their wings clear and almost rayless,
 Their feet always are five-jointed,
 Their waist is almost divided,
 But the two parts are united
 By a very short peduncle.

Next these come the stinging insects,
 Bees and wasps, sandwasps and pismires.

THE SUBSTITUTE.

First of these the bees, *APINA*,
 Called by authors *Anthophila*,
 Or in English flower-lovers,
 For they fly among the flowers,
 Revelling, rifling all their sweetness,
 Gathering pollen, sucking nectar,
 Changing these to wax and honey,
 Building cells with skilful neatness,
 Waxed cells, and all six-sided,
 Waxed cells to hold their young ones.
 Many live in crowded cities,
 Many thousands in a city,
 Like a kingdom or a queendom,
 Female Sovereign, drones and workers.
 Their antennæ stout and elbowed,
 Fore wings flat and never folded,
 Hind shanks flattened out and bristly,
 Formed for carrying loads of pollen,
 Feet as in the rest five-jointed,
 Body joined by a peduncle,
 Armed with sting acutely stinging.

Next the bees, the wasps, *VESPINA*,
 Make the cells but not the honey,
 Build with skill their spacious mansions,
 Build their cells and combs with paper,
 Paper of the finest texture,
 Paper also manufactured
 By these energetic workmen.
 In these buildings, in these mansions,
 Wasps will multiply by thousands,
 Sovereign queen, and drones, and workers.
 Their antennæ somewhat elbowed,
 Each fore wing is folded lengthwise,
 Body joined by a peduncle,
 And their tail is always furnished
 With a sting of fearful power;
 Their hind shanks are plain and simple,
 Formed not for collecting pollen,
 And their feet are all five-jointed.
 Such, in brief, are the *Vespina*,
 Black and yellow wasps, *Vespina*.

Sandwasps follow next in order,
 Sandwasps, fossors or *SPHECINA*,
 Insects that delight to burrow
 In the soft and crumbling sandbanks,
 Making little excavations

For their maggot young to live in.
 Sandwasps do not live in cities,
 But in solitude-so cheerless,
 And away from all companions:
 You may see them in the meadows
 Catching flies, and even spiders—
 Justice vengeful, but poetic—
 And the *Cimicina*, bugflies;*
 These they numb with subtle poison,
 That deprives them of all motion,
 Yet seems scarcely to be fatal,
 So long they retain their freshness:
 Thus numbed, they poor things are carried
 By the predatory sandwasps,
 And safe stowed within their burrows,
 For the maggot young to feed on.
 Their antennæ always elbowed,
 Rather short and almost simple,
 Fore wings flat and never folded,
 Fore legs armed with spines for digging,
 Hind legs also spined, for lifting
 All the spiders, flies, and bugflies,
 That they carry to their burrows.
 Body nipped in at the middle,
 The waist thin and often threadlike.
 Such are sandwasps, or *Sphecina*,
 Sandwasps, woodwasps, or *Sphecina*.

Watch the ant, thou little maiden!
 Mark her labours and learn wisdom!
 Need I tell thee, need I show thee,
 How she plies her ceaseless duty,
 How she excavates her dwellings,
 How she feeds her helpless offspring,
 How she tends them, how she loves them,
 How, in sunshine bright, she suns them,
 How she moves them when in danger,
 From a foe or passing shower,
 How she keeps the stolid plantlice,
 That her young may sip their honey?
 Watch the ant, thou gentle maiden!
 Mark her wise ways, and learn wisdom!
 Note her subterranean cities,
 Where the streets are thronged with passers,
 Where the kings and queens, and workers,
 All intent upon their duty,
 Meet in galleries and pathways,

* Protesting against the altered name.

Kings and queens with wings in autumn,
 Workers, always working, wingless :
 All have their antennæ elbowed,
 All are nipped in or thin-waisted ;
 Queen and workers, too, are furnished
 With a sting so small and pungent ;
 All have feet that are five-jointed.
 Everybody knows the pismires,
 Pismires, ants, or FORMICINÆ :
 Watch them work, thou little maiden !
 Mark their wise ways and learn wisdom !

Now ready, price 4d.,

A LIST OF BRITISH LEPIDOPTERA.

PART I.

Printed on one side only for labelling Cabinets.

Arranged as in the 'Manual of British Butterflies and Moths,' by H. T. STAINTON.

London: John Van Voorst, 1, Paternoster Row.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER. PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAIN-

TON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, N.E., on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

Now ready, price 3s. 6d.,

THE WORLD OF INSECTS : A GUIDE TO ITS WONDERS.

By J. W. DOUGLAS.

John Van Voorst, Paternoster Row.

Printed and published by EDWARD NEWMAN, Printer, of No. 9, Devonshire Street, Bishopsgate Without, London, in the county of Middlesex.—Saturday, February 28, 1857.

THE SUBSTITUTE;

Or, Entomological Exchange Facilitator, and
Entomologist's Fire-side Companion.

No. 20.]

SATURDAY, MARCH 7, 1857.

[PRICE 2d.]

FINIS.

THE 'Substitute' had its origin in the wish expressed by many of the readers of the 'Intelligencer,' that there should be a winter journal containing Lists of Duplicates and Desiderata, Notices of Summer Rambles, &c.; in fact, in the phraseology of the play-bills, we appeared "by particular desire." We have no reason to complain of a want of support, as far as contributions to our pages are concerned, though we confess we should have liked a larger audience, and we now propose to give a retrospective glance at our volume. First, we will take the lists of

DUPLICATES AND DESIDERATA.

These have been numerous and copious, and on the whole, we believe, have been satisfactory. Some persons have been disappointed in not obtaining the insects they expected, and one correspondent vented his indignation in no measured terms, but we have reason to think that the majority of those who have used

our columns are satisfied with their exchanges, and have obtained many species that they would not otherwise have possessed. We are satisfied with knowing that we have been the means of intercommunication between collectors, who, but for our paper, would have remained isolated. Why it is we know not, but nearly all the lists came from Lepidopterists.

Under the head of

CAPTURES

we have recorded more than we expected; in some instances great rarities, and in one a new British species—*Leucania vitellina*.

COMMUNICATIONS.

These form the most bulky and numerous portion of the contributions of our correspondents, and besides "Notices of Summer Rambles," embrace a wide range of subjects. These papers are of very unequal value, as might have been expected. Some have been sneered at for having little in them, but the critics forgot that every one does not know so much as themselves, and that there is

a race of learners to whom the experience of other learners is valuable, especially when those who are their seniors, and might teach them more and better, disdained to instruct them through the medium of our pages. It will, however, be consolatory to some of our young contributors to know that their communications, void though they may be of novelty, on account of the freshness and thorough heartiness exhibited, have received the commendation of entomologists, whose position, ability and power of appreciation are unquestioned. We are, therefore, pleased that we have given these young aspirants the opportunity of appearing in print; and trust that the expectations of better things that we have from some of them may one day be realised. There are other communications that need no apology.

The section of

EXTRACTS

contains, among other good matter, copious quotations from Guenée's great work on the *Noctuidina*, about which we need say nothing, for they have been received with unqualified approval by all.

And now it only remains for us to say a word about the editorial articles. In these we have endeavoured to raise the tone of

thought among collectors, and to lead them to look at Entomology with reference to its science and general principles. Now and then we turned to practical matters, and on one subject, "The Cabinet Question," the communications we received and printed induce us to think that it will be the fault of entomologists themselves, if they are ever again victimised in respect of cabinets.

Once or twice there happened to be an infinitesimal excess of gall in the ink, as we found afterwards by the wincing of certain individuals, though we can affirm that we aimed rather at things than persons. They complained of our abuse of them, but though, like Quixote, we tilted at their windmill, we knew not the owner. If we had, as they wished, printed their communications in reply, there would have been a revelation of what abuse really is, and showed out as it was upon several heads, would have thrown our words into shade, and subjected the writers, and probably ourselves, to action for libel.

And now our melodrama is ended; we make [our bow and retire, thanking those good friends who have assisted us, and hoping and believing that we have been useful in keeping alive during the "winter of our discontent" the embers, which will now need no sti-

mulus to make them resume their wonted heat,—in other words, that we have not failed in our object,—“to feed the flame.”

persons who will take the trouble of writing out a list of species which they have to give for *Minos*].

TO CORRESPONDENTS.

We have handed all the unpublished contributions to MR. STAIN-TON to deal with as he thinks fit.

DUPLICATES AND DESIDERATA.

A young friend of mine in Ireland has entrusted to my charge about twenty-five pairs of *Anthrocera Minos*, unset. Being quite a young entomologist, and at the same time unacquainted with English collectors, he has requested me to offer them in exchange for other Lepidoptera. Any gentleman, desirous of obtaining a pair of *Minos*, will be good enough to write to me in the first instance, stating what and how many specimens he is willing to send in return. The insects must be in good condition, and rarity will not be so much esteemed as quantity.—REV. J. GREENE, *Playford, Ipswich*.

[We regret that we have not room for the list of the species possessed by the offerer of *Minos*, which accompanied this notice; it contains twenty-five species of *Rhopalocera*, eight of *Heterocera*, twenty-four of *Bombyces*, ninety-four of *Noctua*, five of *Pyræles*, and fifty *Geometra*. The majority of the species are not rare, and we expect there are plenty of

COMMUNICATIONS.

What's his name?—Some thirty years ago Old Matthews told a good story of and mimicked, as only he could, a German *cook*, whose “tender sensibilities” allowed him to skin living eels without compunction, though his kitchen apron was up to his eyes in a moment at “the Sorrows of Charlotte and Werter,” lamenting, that as “he could not get dem in de German *language*, he must read dem in de English *tong*,” and now a Liverpool Cookelaments his ignorance of the “language,” and calls on me to put the German into English. Well, he may take the literal translation, “a stripped off and dressed animal’s skin,” or the shorter one, “a tanned hide,” or shorter still, “leather,” whichever he prefers. The poetic is too long a story, and might prove quite as mysterious to him and his friends as it stands in German, and they must just consult some classical dictionary, and under “Amalthea,” will find the tale, and perhaps comprehend it and its application, especially if they bear in mind the specific name first given by Gmelin to the insect which represents the genus in Britain.—PROH PUDOR.

The Murder of the Innocents.—I thank you for your leader in the last ‘Substitute,’ and sincerely hope that it may have some effect on the ravagers. I might have

mentioned 1000 *Adonis*, or thereabouts, as well as the 500 *Cinxia* and 2000 *Corydon*, in my letter to which you refer. What would Venus say to this? Such a man deserves to be single all his life.—REV. E. HORTON, *Wick, Worcesters*, February 14, 1857.

Pupæ in Hedge-rows.—After reading the remarks on pupa-digging, by the Rev. J. Greene, I was determined to try my fortune at it, so I procured a garden-trowel and started on my digging expedition, on Saturday last, to Chingsford, in Essex. I confined my operations to hedge-rows, believing pupæ were to be found there. I dug for half an hour without any success, but I went on, and presently what should turn up but *Chærocampa Porcellus*. Inspired by this good fortune I still persevered, and after I had been digging for one hour I found, on looking in my pupæ-box, the following:—

Chærocampa Porcellus, 2

" *Elpenor*, 3

Sphinx Ligustri, 3

Smerinthus Tiliæ, 2

and several others, of whose names I am not quite certain, thus showing hedge-rows are not to be condemned entirely.—W. H. LATCHFORD, 1, *Plumber's Place, Clerkenwell*; February 16, 1857.

NEW BOOKS.

THE TRANSACTIONS OF THE ENTOMOLOGICAL SOCIETY OF LONDON, Vol. IV. Part 2, 1856, with one plate, *price* 2s. Part 3, 1857, with three plates, *price* 3s. Longman & Co.

MONOGRAPH OF THE GENUS CATOPS. By ANDREW MURRAY, Member of the Royal Physical Society of Edinburgh; of the Entomological Society of France; of the Entomological Society of Stettin, &c. (Reprinted from the Annals and Magazine of Natural History for 1856.)

The papers in the above two parts of the 'Transactions' that are of interest to the majority of English entomologists are—

I. One in Part 2, intituled "How may the Onward Progress of the Study of Entomology be best furthered?" By H. T. Stainton, Esq. The author thus sums up: "The substance of the deductions arrived at, in the progress of this enquiry, is as follows:

1. "Let each student of Entomology restrict himself to some limited field of investigation."

2. "Let each make known the object of his peculiar predilections, and encourage general observers to communicate to him any facts bearing upon it."

3. "Let each, as soon as he has acquired and digested a sufficient amount of knowledge, publish it in an intelligible form, not restricting himself solely to details, but wherever opportunities occur, generalising the subject as much as the extent of his knowledge will permit."

This is good, but we would add a caution against making general deductions from a limited field of observation. Most of the errors in systematic writing arise from this cause; things appear to be generally true, and possibly are so, within a certain range, and yet

when viewed through the medium of a wider experience and larger intelligence, are seen not to have the significance of general principles. Indeed, it seems to us that it would be well for entomologists if, with reference to generalisation, they had the advantage of an acquaintance with other divisions of the Animal Kingdom than the Insecta; to say nothing of the desirability of their knowledge being extended to more than one order of insects. To attempt to systematize without facts gathered over a wide expanse seems to us as illogical as to try to build a castle upon the foundation and with the materials of a cottage.

II. Two papers in Part 3, respectively intitled, "Notes on the Wing-Veins of Insects, by J. O. Westwood, Esq., F.L.S." and "A Revision of the British *Atomariæ*; with Observations on the Genus," by T. Vernon Wollaston, Esq., M.A., F.L.S." Mr. Westwood's paper is intended as a reply to one by Mr. Newman, published in a former part of the 'Transactions,' in which this author contended that the rays of an insect's wing perform precisely the same functions as the bones of a bat's wing, and that the wing of a butterfly is the exact analogue of the wing of a bat: Mr. Westwood adduces no experiments of his own, but contends from the observations of others that Mr. Newman's theory is not true, and that the wing-rays are essentially veins. We do not think, however, that the question is settled, and we hope some of our microscopists will devote their attention to it.

Mr. Wollaston's "Revision of

the British *Atomariæ*," referring, as it does, to a difficult and neglected genus of Coleoptera, is especially valuable. It is no figure of speech to say that the species of the genus, as they appear in Stephens' 'Manual,' are a perfect chaos, and the difficulty of making them out was increased rather than diminished by a reference to that author's collection, where sometimes four or five species were mixed under one name, and sometimes one species had five or six names. We are all, therefore, under great obligations to the author of 'Insecta Maderensia' for unravelling these mysteries, which he has done in his usual masterly manner. We quote the following remarks from the introduction to the paper.

"The confusion which has unfortunately arisen through the inaccurate identification of the late Mr. Stephens, whose collection (now in the British Museum) must moreover be regarded as the sole interpreter of his very meagre and unsatisfactory diagnoses, has rendered the task a somewhat tedious one; nevertheless, a careful collection of his entire series (amounting, however, to only 111 specimens in all), in conjunction with the assistance which I have derived from the material which various friends (amongst whom Messrs. Waterhouse, Janson, Douglas, Murray, and Morris Young should be particularly mentioned) have placed in my hands, has enabled me, I trust, to form a tolerably correct estimate as to the actual species which our fauna includes. The examination of 1,137 British specimens from various parts of the country (661 of which were collected by myself, and 247 by

Mr. Waterhouse), has given me a very fair insight into the amount of aberration from local disturbing causes, to which the several representatives are subject; and if, in addition to this, I include the 87 Continental types with which my cabinet is supplied, the specimens which have passed under my own immediate observation, while compiling the present memoir, is no less than 1224."

We are confident that we express the general wish of English Coleopterists, when we say that we hope an author who has such stores of material and knowledge will give his assistance in the revision of some more of the genera of small Coleoptera, which require to be overhauled quite as much as *Atomaria*.

Mr. Murray's 'Monograph of the Genus Catops' is another valuable rectification of a difficult genus of Coleoptera. It is not confined to the European species, but includes exotic, and in drawing it up, the author had the assistance of those English and foreign entomologists who have specially studied the genus, so that this paper may be looked upon as the last exposition on the subject, and being written in English will put us in possession of information scattered through many books in various languages. It contains a rapid glance at what has been done by previous authors, first in the European and afterwards in the exotic species; their detailed descriptions, frequently illustrated by outline figures, of all the different species which have been described or have come under the author's notice; and lastly, a short dichotomous table of the charac-

ters of the European species of the genus.

We find a note at page 6, which we cordially endorse and copy below.

"If an author describes a species so loosely that it cannot be recognised from his description, so that subsequent authors misapply or ignore his name, while on their part they give a recognizable description, I cannot see on what principle of justice or propriety we are to be called upon to hold by the unrecognizable name instead of the recognizable, nor why an author (be he living or dead, or great or small) should be allowed to supplement his inadequate description by a reference to the typical specimens in his cabinet from which the descriptions were taken, — a practice now in vogue, against which I take this opportunity to enter my protest."

At page 48, under *C. chrysomeloides*, we find mention of an old fashioned beetle-trap, but it may be new to some of our readers.

"Mr. Bates, of Leicester, has taken hundreds (and supplied me largely) by a simple trap which is very useful for taking some of our rarest *Clavicornes*. He puts three or four rabbits' feet into a soda-water bottle, buries it in a favorable locality, so that the mouth of the bottle is level with the ground, and in a week or ten days the interior of the bottle is swarming with insects, among which great rarities occasionally occur."

We have to express regret that a memoir of so much interest to English Coleopterists should have appeared in the 'Annals' — a magazine which contains so little entomological matter that not one

in fifty of us buys or sees it. It is true that the author makes as much amends as possible by giving away freely copies of this reprint, but as it is not to be bought there are many of our brethren who are unknown to the author, that have little chance of ever seeing it.

We hope Mr. Murray will extend to other genera of beetles an investigation and revision similar to those bestowed upon *Catops*, and thus, with the assistance of coadjutors, hasten the time when we shall be able to tell what species of Coleoptera we have in Britain.

THE NATURAL HISTORY REVIEW,
No. 1, 1857, 3s. London:
Williams & Norgate.

This is one of the best numbers that has appeared, and contains much matter of interest to entomologists. One paper is intituled, "Retrospect of Various Works published during the last year, New Editions, and New Works in progress." The entomological portion, by Mr. Haliday, is especially valuable, for it brings into one view the labours of both continental and British Entomologists during the year 1856, or rather so much of them as has been published. Among the books on Coleoptera reviewed are Redtenbacher's "Fauna Austriaca," Fairmaire's "Faune Entomologique Française," and the continuation of "Erichson's Insekten Deutschlands," by Dr. Schaum and Messrs. Kiesenwetter and Kraatz, and here we find the following remarks. "It would be hard to over-rate the prospective utility of

this (latter) work to the scientific entomologist; and we heartily wish it a steady and uninterrupted progress, and an increasing number of readers. For the convenience of the mere British collector the "Faune Française" will probably be found the more suitable, as it will certainly be far the most portable, if both works are continued on the scale commenced respectively. We can scarcely wish it were otherwise, as there is occasion for *both* of these attempts to supply much-felt existing deficiencies; and while each is particularly accommodated to its own circle of readers they may both be serviceable to *all*, as mutually supplementary. We reserve for a future occasion a more particular critical examination of them when further advanced towards their completion respectively; our object now has been only, or chiefly, to bring them under the notice of British entomologists who are discontented with the home-made provisions for the wants of the beetle-collector, and desirous of some stronger food to promote scientific growth. While *they* are only in progress, we recommend, for present use, Redtenbacher's book, as already complete in its own sphere of investigation, and as approved by our private experience, in its application as a guide to the correct and easy determination of the great majority of the British beetles also." This advice may be sound enough for those who can read Latin, German and French, but the greater number of those who are now asking for a Manual of British Beetles understand only their mother-tongue, and they, we think not unreason-

ably, beg those better informed than themselves, to put them on a level with the Lepidopterists. If those gentlemen who have set themselves to the revision of our native Coleoptera would only take up the families in consecutive order and work in concert, the requisite book could be produced in parts, and proceed close in the rear of those of the continental authors, having nearly all the advantages of the collation of their labours which would be available if the publication were postponed until the foreign books were finished.

The "Notices of Serial Publications" extend to forty-four closely printed pages, and embrace works both British and Foreign on all the branches of Natural History. The naturalist may here see what is doing both in Europe and America up almost to the present date, and the editorial notes occasionally given enhance the value of these "Notices." Entomologists and others are thus put in possession of information which they cannot obtain from any other single publication, and this portion of the review deserves all praise.

EXTRACTS.

NOTES ON NOCTUÆ: FROM GUENEE'S NOCTUELITES.

[Continued from p. 215.]

Orthosidæ.

This is a family of which the characters are doubtless very slight; it is rather difficult to point out the differences between it and the *Noctuidæ* and the *Ha-*

denidæ, and yet we recognise at a glance either the larvæ or perfect insect: indeed the word orthosiform is used adjectively to characterise whatever resembles them.

The larvæ are regularly cylindrical, always smooth, elongate, without projection, and with the spots level with the surface; some live on trees, and some on low plants: sometimes even when young they are tree-feeders, and afterwards feed up on low plants; of this the genera *Cerastis* and *Xanthia* furnish us with examples; some of them feed indifferently on either growth when nearly full fed. It may be said that they avoid the light, rather than that they conceal themselves, by retiring under the leaves; some even remain almost exposed. They are, perhaps, of all the *Noctuæ*, most generally diffused, and they abound around us; they are not, however, generally very destructive, with the exception of *Trachea*.

The perfect insect, as I have said, has an aspect *sui generis*, the palpi generally slender or incumbent, and the reniform stigma, of which the lower portion is almost always dusted with black, are the two most striking characters by which we can recognise the greater number at a glance; but these are not rigorously necessary to characterise an *Orthosia*; the wings are generally disposed at a considerable angle when the insect is at repose. The *Orthosidæ* only fly by night, and are found by day resting on the trunks of trees or palings; the greater number do not appear till the autumn, but some appear in the first days of spring, yet they are

not, at least generally, double-brooded. (Vol. I., pp. 338, 339.)

Trachea.

The extreme shortness of the palpi, the head small and concealed, the woolly clothing of the thorax and abdomen, the legs, &c., approximate this genus to the *Bombyces*, with which Fabricius had placed it; but the tongue, though short, is very distinct, the position of the wings in repose is quite that of the *Noctuæ*, as is also the neurulation, and the larva and chrysalis leave us no room to doubt.

The larva of the only species of *Trachea* has quite the appearance of our *Orthosia*, and the lines are more sharply marked than any other; it feeds in great numbers on fir trees, especially on *Pinus sylvestris*, which it sometimes completely devastates, but, as it always remains quite exposed on the leaves, which are not large enough to cover it, it is open to many risks of destruction, so that M. Treitschke says "hardly one per cent. escapes," but this does not prevent it from causing great ravages in some forests. (Vol. I., p. 339.)

Taniocampa.

The *Taniocampa* are recognised at a glance by their hairy body; the wings being powdery, and as it were mealy; the palpi and tongue short, &c. They have a very Bombyciform appearance, and if we add that the majority of the species have pectinated antennæ, we shall hardly be surprised that ancient authors, deceived by these external characters, had classed

them almost all with the *Bombyces*.

The larvæ are hardly less recognisable; the neatness of their lines, their body long, velvety, most frequently adorned with gay colours, or agreeably variegated, often cause them to be marked; the greater part of them are common, and it is not often that we beat a dozen trees without causing several of them to fall. Hence they would become destructive to our oaks, elms and poplars, on which they feed by preference, if Nature had not imposed a particular obstacle to their multiplication; this obstacle is the facility with which their chrysalides dry up, which only allows about a third of those which assume the chrysalis form to arrive at a perfect state. What is very remarkable is, that this drying up takes place when the insect is almost ready to appear, so that we find the perfect insect entirely formed in these abortive chrysalides. If we add to this precaution of Nature, the ordinary accidents to which all larvæ feeding exposed are liable, birds, Carabidæ, ichneumons, flies, which do not spare these any more than other species, we shall understand why it is that *Noctuæ*, so widely diffused and of which the eggs are hatched at so propitious a season, do not become a pest. Independently of all these enemies, some larvæ of *Taniocampa* have even another enemy in individuals of their own species. In fact those of *cruda* and *miniosa* are cannibals, and when shut up one with another, or with other caterpillars, they attack and devour them with the ferocity which soon finds its punishment in a

disease brought on by this propensity, which speedily causes their death.

All the *Taniocampa* do not live on trees, but those which do not are the exception. *Gothica* and *gracilis* are in this case, but the perfect insects do not differ from the tree-feeding species, and we cannot always base the establishment of groups on this difference of life.

The perfect insects appear generally in early spring, and fly at dusk around the sallows, from the blossoms of which they obtain an abundant repast. It sometimes happens that they remain there during the day, and then we can cause them to fall by shaking the branches, but more frequently they retire to the trunks of trees or amongst the herbage; but the best means to obtain them in any quantity is to rear the larvæ, which, as I have said, are very easy to find. The sexes differ little: some species vary excessively, and this has caused the creation of a number of separate names. (Vol. I., pp. 346, 347.)

Anchocelis.

This genus, very homogenous, is quite as valuable as the other genera of the family, and even better defined, and easily recognised at the first glance. The larvæ all live on low plants, and conceal themselves during the day under the leaves nearest the ground. They are of rather dull colours, marbled or dusted with brown or reddish on a green ground-colour; the anal plate and the plate on the second segment are well marked. It is in this

genus that we find a very curious exception; it is the larva of *lunosa*, which lives concealed under stones like an *Agrotis*, and of which the spots are warty and shiny entirely as in the *Agrotis*, whereas the perfect insect has nothing to distinguish it from the other species of *Anchocelis*. These exceptional manners would furnish a powerful argument to the adversaries of a natural method, if a single fact could invalidate a thousand others, and if we were not here to apply the universal maxim, the exception proves the rule.

In a perfect state the species of this genus are known at once by the pale nervures of the wings and the reniform stigma being contracted, and as it were strangled in the middle. They keep their wings inclined at a considerable angle, and do not differ in their manners from the other *Orthosidæ*. It is in the autumn that they are met with, and often when the season is far advanced; some of the species vary excessively, and this has given rise to the creation of a number of pretended distinct species. (Vol. I., p. 363.)

Cerastis.

This is another genus recognised at a glance, and it is unnecessary to insist on its characters. The larvæ of *Cerastis* are elongate, cylindrical, but attenuated in front; of a brown or reddish colour, and with the plate of the second segment well marked. They feed on low plants, and concealed as in *Anchocelis*, but only when grown up; when young they prefer the young shoots of trees, and it is not

till after the second or third moult that they descend to the earth.

The perfect insects are hatched in autumn, and often hibernate before copulation. Not unfrequently we find them in early spring concealed in holes or crouching in shrivelled leaves, but only singly. The position of the wings is very different from that of the other *Orthosidæ*. Instead of having the anterior wings inclined as a sharp angle, as in *Anchocelis* or *Orthosia*, they keep them parallel to the object on which they rest, and partly crossed one over the other as in *Agrotis*. If to this we add that the abdomen is so decidedly flattened and even hollowed in the middle, we shall see why it could be impossible to confound the genus *Cerastis* with any other. This last-named character is even found in the females, which are, hence, very difficult to distinguish from the males, and it is only by a little greater fulness of the body and by a slight difference in the ciliation of the antennæ, that we succeed in separating them, and even for that it requires an experienced eye.

In this genus we find numerous varieties very different from the types, and distinct species very close to each other; hence it requires a profound study, and a knowledge of their first states is indispensable. But for that, we should certainly take some varieties of *Vaccinii* and *erythrocephala* for distinct species (as indeed many of us have done); on the other hand, we should not distinguish *spadicea* from the former, nor *Veronica* from the latter. (Vol. I., pp. 377, 378.)

Scopelosoma.

This genus, which many authors have mixed with *Cerastis*, is distinguished by the form and habits of the larvæ, and in the perfect insect by the form of the thorax and the markings on the wings, which are much more oblong and more dentate.

The caterpillar lives, when young, either concealed between the seeds of the elm or inclosed in the young leaves of different shrubs, particularly of the bramble; it fastens the edges of the leaves like the *Cosmiæ* and some of the *Tortrices*. When it is more fully grown it lives on low plants like all the *Orthosidæ*. This larva is carnivorous, and spares neither other larvæ nor those of its own species when it is shut up with them. (Vol. I., p. 386.)

Dasyampa.

This is the only exception in this and the allied families of a hairy larva. This is also the principal character of the genus, which I created in 1837, and which has been adopted by modern authors. In the perfect state there is very great affinity with *Cerastis*, from which it is only distinguished by the better developed palpi, the crested thorax, and the markings of the wings. The perfect insects have precisely the habits of *Cerastis*, and like them their existence is prolonged far into the winter, and even into the following spring; warm seasons are favourable with us to their multiplication. The larvæ are fond of spinning their cocoons close to one another, and we find

them thus clustered even in nature. (Vol. I., p. 387.)

E. Newman acknowledges the receipt of 21s. from the Sheffield Entomological Society; 1s. from W. W.; 3s. 8d. from W. H.; all for the widow of the late Mr. Hemmings. He is also requested to state that the collection formed by Mr. Hemmings will be sold by Mr. J. C. Stevens on Friday, March 13, at 1 o'clock, for the benefit of the widow: it consists chiefly of good British Coleoptera and Micro-Lepidoptera, both in fine condition: also a small cabinet.

CLOTH COVERS for BINDING the Volume of 'THE SUBSTITUTE' may be procured of the Publisher at One Shilling each.

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A RE-ISSUE of DOUBLEDAY'S GENERA of BUTTERFLIES, or DIURNAL LEPIDOPTERA, in Parts, price 5s. each coloured, or 2s. 6d. each plain, will commence on March 31, to be continued Monthly, and completed in 54 Parts.

. It is not intended to reprint this work; and there remain only 106 sets to be re-issued as above.

London: Longman, Brown, Green, Longmans and Roberts.

On Saturday, April 4th, 1857, will be published No. 27 (the first Number of the New Volume) of

**THE ENTOMOLOGIST'S
WEEKLY INTELLIGENCER.** PRICE ONE PENNY.

To be continued weekly during the summer months (that is, till the end of September), for the purpose of instantaneous transmission, amongst the Entomologists of this country, of all important Entomological information.

Those who make any discoveries or captures of importance are requested to communicate at once to the Editor (Mr. H. T. STAINTON), and all authenticated intelligence received by him prior to the Wednesday will be published in the 'Intelligencer' of the following Saturday.

Those who wish the 'Intelligencer' forwarded by post on the day of publication are requested to transmit 4s. 6d. in postage stamps to E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, N.E., on or before March 20, 1857.

Will be published every Saturday by E. NEWMAN, 9, Devonshire Street, Bishopsgate Street, and by W. KENT and Co., 51, 52, Paternoster Row; and may be had of all Booksellers and Newsmen.

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