

RD & W 1996

THE
YOUNG NATURALIST :

A MAGAZINE

OF

NATURAL HISTORY,

CONDUCTED BY

JOHN E. ROBSON, Hartlepool,

WITH THE ASSISTANCE IN VARIOUS DEPARTMENTS OF

G. C. BIGNELL, F.E.S., PLYMOUTH; JOHN GARDNER, HARTLEPOOL;
G. COVERDALE, LOUISIANA, U.S.; C. S. GREGSON, LIVERPOOL;
GEO. ELISHA, LONDON; JOHN SANG, DARLINGTON;
Dr. ELLIS, F.E.S., LIVERPOOL; J. P. SOUTTER, BISHOP AUCKLAND;
SYDNEY WEBB, DOVER.

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THE
GEOLOGICAL MAGAZINE

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JOHN B. GREGSON, Liverpool

WITH THE ASSISTANCE OF VARIOUS DEPARTMENTS OF

- BIGGILL, F.E.S., Plymouth;
- JOHN GARDNER, Liverpool;
- OVERDALE, Louisiana, U.S.;
- G. S. GREGSON, Liverpool;
- ELISHA, London;
- JOHN SAUNDERS, Darlington;
- ELLIS, F.E.S., Liverpool;
- F. R. SOUTTER, Bishop Auckland;
- SYDNEY WEBB, Dorset.

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1885.

IN giving a list of new Lepidoptera occurring in 1884, on page 276 of the fifth volume of this magazine, we said "Those we are likely to add to our lists now will have a large preponderance of small or inconspicuous species." In startling contrast to this assertion, no less than two new butterflies seek admission this year, one of which is both large and conspicuous. Some half-dozen Tinea are also to be added. 1885 has also given to our collections an unusual number of rare and interesting species, especially among the Sphinges. Particulars are as follows:—

1. *Lycæna Argiades*, Pall.

Two specimens of this little blue were taken on Bloxworth Heath, Dorset, on the 18th and 20th August last year, by the sons of the Rev. O. Pickard-Cambridge. A third specimen was taken near Bournemouth, on the 21st of the same month, by Mr. Philip Tudor. The record of these captures calling attention to abnormal looking blues, two other specimens were found by the Rev. J. S. St. John, of Frome, in a small collection he had purchased, and which are presumed to have been taken in Somersetshire. There can be no doubt of these captures being genuine, and we will look with some anxiety for its recurrence this season. There is no reason why it should not occur with us, as Britain is quite within its range, and its food-plants are found here. In appearance *Argiades* most nearly resembles *Ægon* on the upper side of any British species; on the under side it is nearer to *Alsus* or *Argiolus*. It may readily be recognised by the small tail on the hind wings. It is to be hoped that its appearance next year will settle the point whether these are accidental visitors strayed across from France like the *Batica*, that have been found in the same neighbourhood, or genuine natives with a right to admission to our lists.

2. *Danais Plexippus*, Linn.

No less than ten specimens of this large and handsome butterfly have been recorded as seen or captured in the latter part of last summer. They

have occurred in the Southern part of the island—Cornwall, Devonshire, Dorsetshire, and the Isle of Wight—and under circumstances that makes it probable they were bred in this country. It is an American species of extensive range, and well known for occasional appearance in immense migratory swarms. It seems doubtful whether a butterfly so powerful on the wing as is this species could really cross the Atlantic, but a specimen was brought me this year that had been taken on board a screw-steamer coming from America. The gentlemen who brought it had omitted to mark the latitude and longitude as he generally does, but he thought it was some 600 or 700 miles from New Orleans. It is easy to imagine a butterfly tired with so long a flight might rest several days on such a vessel, and thus reach our shores in safety and deposit its eggs. In 1876 the same species was captured in Sussex, and was then also supposed to have been reared where taken. Indeed there had been rumours for a year or two before this, of such an insect being seen occasionally. It is quite possible for the species to become naturalized here if a few impregnated females reached us, and like its near relation *D. Chrysippus*, that has also occurred in England, it has strong migratory instincts. The time has not come yet, however, when it can be recognised as a British species.

3. *Coleophora Potentillæ*, Boyd.

In the E.M.M. for April last (p. 254), Mr. George Elisha announced this species. Like so many other novelties it appears to have occurred in more places than one. Mr. Elisha took it at Walthamstow and Snaresbrook in Epping Forest. Mr. Fletcher, of Worthing, was taking it at the same time, and Mr. Boyd had fully worked out its life history. Mr. Elisha does not describe the species, and Mr. Boyd's MS. description appears to be unpublished, so there seems a nice opportunity for some one to steal a march upon the discoverers of the species and name it anew, thus helping to confuse our lists.

4. *Lithocolletis Anderidæ*, Fletcher.

This novelty is described by Mr. Fletcher in the E.M.M. for July last (p. 40). It was bred from larvæ mining birch leaves in October.

5. *Coleophora Tinctoriella*, Coverdale.

Described in September last by Mr. George Coverdale, from larvæ found by Mr. Vine, of Brighton, on *Genista tinctoria*. Mr. Coverdale's article in the *Entomologist* (p. 225) carefully discriminates between this and the nearly allied species.

6. *Gelechia Tetragonella*, Stainton.

Described by Mr. Stainton in the E.M.M. for October (p. 99), from specimens taken by Mr. Sang, amongst *Artemisia maritima* in salt marshes, at the

mouth of the Tees, near Greatham, in July. In the article Redcar is given as the locality, but that is a mistake, Redcar being on the Yorkshire coast, considerably below the mouth of the Tees. In the same magazine for December (p. 102) is an account of its discovery in Norfolk in the preceding July. Mr. Sang first took it in 1881. The larva is not known. Mr. Sang was of opinion that it only sought the *Artemisia* for shelter, and that plant was absent from the Norfolk locality.

7. *Hyponomeuta Malinellus*, Zell.

In the E.M.M. for October (p. 100), Mr. C. G. Barrett has a paper on this species, and appears to prove satisfactorily that the apple-feeding species found in this country is not, as has been hitherto supposed, a mere form of *Padellus*, but that known elsewhere as *Malinellus*. The larvæ differ, the cocoons are differently spun, and though no reliable difference has yet been detected in the imago, those Mr. Barrett reared were both larger and lighter coloured than ordinary *Padellus*; they also emerged earlier.

Of the above, *C. Potentillæ* and *Tinctoriella*, *L. Anderidæ*, and *G. Tetragonella* are all new to science.

Besides those here enumerated, records of other novelties whose history is not yet fully worked out, have been made. A new *Oporabia* (*Approximaria*, Gregson), was mentioned in the *Young Naturalist* for February (vol. vi., p. 48). Of this species we have had the pleasure of examining one specimen only, and so far as can be judged by the examination of a single specimen, *Approximaria* will prove a good species. Mr. Gregson has also obtained a pupa at Scarlet Rocks, Isle of Man, that produced an imperfectly developed moth utterly unknown to him (See Y.N., vol. vi. p. 215). Mr. Sang has found the mine of a *Nepticula* near Newcastle-on-Tyne, that is new to him, on *Potentillæ tormentilla*. If not *N. Tormentilla*, a continental species, Mr. Sang thinks this will be new to science. This year will probably show as he has some in pupa.

CUCULLIA ARTEMISLÆ is "added to the British fauna" in the *Entomologist* for November last, by Mr. W. Brooks, the gentleman who takes *Calimorpha Hera* so freely. This species is enumerated among the reputed British species in the first edition of Doubleday's synonymic list. It is not included in the above list, pending some further information. Of *C. Hera* and its reported occurrence we have something to say elsewhere.

CONCHOLOGICAL JOTTINGS.

By ALBERT H. WATERS, B.A., M.C.S., &c.

Deftly wrought by Hand invisible,
 Painted and sculptured by th' unseen Power which works
 In all things living, and fashions out their shapes.
 The calcine atoms drawn by that mysterious Force,
 Through which th' Almighty works, each to its proper place
 Builds up by slow degrees, the shell whose shape
 And beauty we admire.

The Science of Conchology is one which possesses great charms for me, and I have been a shell collector the greater part of my life. I am thinking that possibly there may be a few Conchologists among the readers of the *Young Naturalist*, and if so, the few random notes contained in the present paper may be of interest to such; possibly, moreover, I may induce some Young Naturalists who have not taken up the study, to do so.

The Science of Conchology is not open to the reproach which the unthinking portion of the public, levels at many other "Ologies," namely that it is a useless pursuit, for when one considers how many molluscs, such as whelks, periwinkles, mussels and oysters, are articles of food of no slight importance; and when one bears in mind the economic value of the pearl-bearing species, it must be admitted that the man who studies their habits and the causes which influence their increase or diminution, is doing good service to the community at large.

I shall not enter into statistics in the present paper, or I might try to estimate how many tons of the edible molluscs, are annually dredged up from the deep sea, or gathered by hand from the rocks at low tide, I might endeavour to reckon up how many persons obtain their livelihood by capturing them. It would be all very interesting no doubt, but I forbear; my concern is with the creatures themselves.

I think a shell-hunt on a sandy beach after a storm is a most enjoyable occupation. The billows in their raging fury, have torn from the recesses of the deep, many and many a cunningly wrought shell, and they lie stewn on the strand with masses of seaweed, star-fish, jelly-fish, sea-anemonies, crabs, and many other things, all interesting to the naturalist. I have paid many a visit at the time of the equinoctial gales, to that large bay opening out of the North Sea on the eastern coast of England, and known as The Wash. It is a region having a rich marine fauna and one which I believe has not yet been fully described. I have been working at it myself for some time and possibly when my notes are more advanced, I may give them to the world

through the medium of this magazine. I shall, I trust, complete them ere long, but I am labouring under the disadvantage of not living on the spot. However, I pay it a visit whenever I can, and the railway communication with Cambridge is cheap and rapid so I am getting a fair amount of knowledge of the marine zoology of this region.

I will not at present attempt to give a complete list of the shells I have found there, but will reserve this for a future paper. I will merely mention a few of the Gasteropoda now and jot down a few remarks about them.

Purpura lapillus is common and I take home many living specimens in the hope of acclimatising them to my aquarium, but it is a species which does not seem to bear confinement well, for mine always die after I have had them a few months. Their favourite food is a fresh mussel, and they do not take kindly to the scraped meat with which I feed all the carnivorous denizens of my aquaria. I do not succeed well either with the Common Edible Whelk (*Buccinum undatum*), I fancy they require a deeper body of water than my small aquarium.

The Dog Whelks (*Nassa reticulata* and *Nassa incrassata*) are very common on the mussel beds in front of Hunstanton Cliffs. Contrary to my experience with *Purpura lapillus* and *Buccinum undatum* I have little difficulty in keeping these and they thrive very well in my aquarium. They like shallow water best and spend much of their time out of that element, thus resembling the common periwinkle in their fondness for an amphibious sort of existence. They eat scraped meat fairly well but prefer a piece of dead fish or fresh mussel. They always feed at night; never, as far as I have observed in the daytime. Their sense of smell is very keen and they soon find the meat out. Whelks rasp their food with their lingual ribbon instead of masticating it. This lingual ribbon is furnished with numerous siliceous teeth, in *Buccinum undatum* there are as many as a hundred rows of these teeth and they are quite capable of rasping a hole in a mussel shell; a feat which indeed *Purpura lapillus* often performs. The tongue of a whelk forms a very interesting microscopic object, and one well worth the trouble of preparation.

Periwinkles are abundant on the rocks which the receding tide leaves bare. *Littorina littoreus* varies a good deal, not only in the ground colour of its shell, but also in the number of its bands. I have found over a dozen different varieties at Hunstanton, on the Norfolk coast of the Wash. The commonest forms are black with no bands, and black with one brown band, spire of shell white. Greenish grey forms are also common; some of these have twelve black bands, others have the same number of brown ones, and I have found specimens more rarely with four broad black bands, and three narrow brown ones with one red band close to the spire; these last have the spire of the

shell grey, with two broad brown bands and one black one near the top, the extreme tip of the shell in this very pretty variety is white. I have also found specimens with twenty distinct brown bands. Other forms I have found are red with seventeen brown bands and red with no bands. In both these the spire of the shell is white, but red forms also occur in which it is of the same colour. There are also varieties with the ground colour olive green, with fine broad black bands and four narrow ones, yellowish grey with seven brownish bands, grey with no band—lip of shell black, yellow with no bands—grey spire, and orange yellow with spire of same colour. Very young specimens bred in my aquarium are brown, and of a shape quite different to that of older ones, being in fact inclined to a fusiform construction.

(To be continued.)

CALIMORPHA HERA AGAIN.

By JOHN E. ROBSON.

Among the articles of my creed as a Lepidopterist, I may mention an utter want of belief in this handsome species as a British insect. That it has occurred is not to be denied, but that it is a genuine Britisher I cannot admit, nor as yet that it is a naturalized foreigner. It is curious how very few of the "reputed" species of Doubleday's first edition have established their claim for admission to our lists, and equally curious to notice how easily some species are admitted, and how persistently others are kept out. If a well known Entomologist takes a single specimen, it is quite enough. If species occur two or three years in succession it is more than sufficient. *Hera* was admitted in the "Entomologists' Annual" for 1872, was inserted in the Supplement to Doubleday's "Synonymic List," and, of course, is in Mr. South's list also. It is said to have been taken in Devonshire in 1882, 1883, 1884, and again in 1885, but I have never yet met with any one who believes in it. That it has really been taken at Starcross there is not any doubt. I do not know Mr. W. Brooks, who was the first to announce its capture, but Mr. J. Jager can undoubtedly be relied on. The question therefore to be considered now, is not whether the species has been taken at Starcross, but how it came there. The specimen taken in 1871, on the strength of which the name was admitted to our lists, was undoubtedly introduced among imported plants. If the recently captured specimens have been introduced in pupa, it must have been done intentionally, and the specimen taken by Mr. Jager being of the variety *Lutescens*, points to France, where that form is not uncommon, as their probable home. Planting *Hera* to find it

again is an old dodge, but so little is known in England of the habits of the species that no one seems to know exactly what to do. Our old friend Mr. Gregson was once selected as the victim who was to vouch that *Hera* was really British. He was taken a round of lamps at night, for the idea then was, it was a nocturnal species like *caja*. Lamp after lamp was examined to no purpose, but as they neared the very last a flash of red was to be seen against the glass. Gregson was off like a Hawk or a Hawk Moth, and in spite of the efforts of his companion to stop him, and precede him up the post, he was up in a moment to find *Hera* indeed, but *Hera* with a pin in it, carefully fastened to the angle of the lamp to await discovery. Mr. D'Orville's specimen in 1871 was taken at night, but Mr. Kirby says it frequents stony places covered with flowers, especially in lilly districts, and flies by day. Mr. Brook's took one as "returning from my morning's collection," another "flying in the sun," and though not stated, all the others appear to have been taken in the day-time, except one which was found "as it was getting dark." Mr. Brook's specimens appear to have a partiality for secluded narrow lanes, and several of them have been beaten out of hedges. Mr. Brook's makes one remark that is worth noticing. He says his specimens "as compared with foreign ones are extremely large." I would have expected, if native, to find the species at the extreme of or beyond its range as being small and stunted, rather than any extremely large. Of the examples of the species that I have had in my possession, those from the neighbourhood of Paris were "extremely large," and my examples of the variety *lutescens* from that district are the largest I have seen. It would be interesting to know the present whereabouts of the dozen examples Mr. Brook has taken, and how many more have been purchased at long prices on the faith of these records.

Talking these *Hera* captures over with my friend Mr. John Gardner, in conjunction with the reported capture of *C. artemisiae*, by the same fortunate individual, we stumbled quite accidentally on a most curious discovery, which I may as well relate here, premising that the J. Brooks of the following story is not the W. Brooks of *Hera* celebrity.

Some time ago a Mr. J. Brooks offered pupa of *Cucullia gnaphalii* for exchange. Mr. Gardner answered the exchange, and after some correspondence received "one pupa of *gnaphalii* and one of *A. alni*." These were carefully tended, but that said to be *Alni* never emerged, and from the other a very beautiful insect appeared, nothing like *gnaphalii* and quite unknown to both of us. Remembering the name but not the initial letter we wondered whether the *Gnaphalii* Brooks and the *Artemisiae* Brooks were the same and Mr. Gardner suggested to get the letters. These were found, and the difference of the names of the writers noted. But while holding the letters of J.

Brooks in my hand, a familiarity in the writing struck my eye, and after a moment's hesitation I named the writer. Entomologists will well remember how numbers of us were taken in ten or twelve years ago, by a reported find of larvæ of *Pityocampa processionea*, which were freely exchanged for anything good that was obtainable. The finder of *Pityocampa*—a Mr. T. Batchelor, of Yew Tree Farm, Southborough, Kent—could also offer *Daphidice*, *Lathonia*, *Sacraria*, *Purpuraria* and other similar insects, in the most innocent manner, being quite “a young beginner,” and willing to accept anything useful in return for these species. Mr. Batchelor's letters were hunted up and compared with those of “J. Brooks, 11, Granville Road, Tunbridge Wells,” and they were identical. The least experienced in handwriting could not doubt the fact, and the style was the same innocent unsuspecting sort of thing that made one wonder whether Mr. T. Batchelor was a knave or a victim. The same errors in spelling, too, were found in the letters, both gentlemen were “bussy,” both “recieved” the insects, and both remained “yours truely.” It was a good idea that, after having both been victimized by Mr. Batchelor, my friend, who is rather wideawake, should be done a second time. Are there any other victims? I shall be glad to forward the letters to any desirous of examining them.

NOTE ON A PART OF THE GREAT COLLECTION OF LEPIDOPTERA RECENTLY BEQUEATHED TO THE PUBLIC MUSEUM AT LIVERPOOL, BY THE LATE NICHOLAS COOKE, ESQ., OF LISCARD, CHESHIRE.

By C. S. GREGSON.

I have just returned from the ninth associated Soiree of the Scientific, Literary and Art Societies of Liverpool, held to-night, at St. George's Hall, and there saw exhibited a portion of the great collection of Lepidoptera presented to the Liverpool Free Museum, by my late friend Nicholas Cooke. This extensive collection contains the whole of the magnificent collection of purely British Lepidoptera collected by my late friend Noah Greening, of Warrington; and with a part of them is now incorporated part of Mr. Cooke's own collection, which, unfortunately, is not exclusively British. Nay, it contains series of reputed British species, and to these he has added every species that the dealers have introduced as British, the result being a fine

series of everything he could obtain freely, or which the dealers in insects could obtain for him, and two or more specimens of some species which he had not room for in his drawers. The presence of these doubtful species, of course, takes away all interest in and all absolute value as British from every specimen in the collection. But worse than this he was engaged, some time before his death, in re-arranging the whole collection by the unfortunate list of obsolete names recently issued. A few drawers are completed, and, I am told, several others are emptied into store boxes. As he saw the error he had made by using a list he did not like, he shortly before his death commenced to rectify it, and so intensified the difficulty of again getting the collection in order. It is true he has labelled the specimens in his drawers, and this is a redeeming point, as they can all be removed when the collection is re-arranged—but who is to do this?—to remove a full row of every British macro, not only from the drawer or the store box it is in, and place it where it should be in the arrangement chosen, is not an easy undertaking, but until this is done this grand collection—worth one thousand pounds—is worse than useless, *it is misleading*.

I am told there is a clique of insect collectors who use the obsolete names Mr. Cooke had adopted for a few of his earlier drawers, and then rejected, but as I see no likelihood that British entomologists will ever use them, it behoves our leaders to let us have our public museum collections available for correct reference as early as possible. Mr. Greening's undisturbed drawers are arranged by the French system of Boisduval and Guenée, which is based upon the affinity of the larvæ, modified here and there by Mr. Greening, in accordance with his own knowledge of the morphology of the groups or species, but always on the lines of the French system of arrangement. These drawers exhibited intact alongside the drawers which had been re-arranged by Mr. Cooke, shewed to great advantage the superiority and natural appearance of the French system over the German as adopted by the "Entomologist List," when viewed together on a large, long table. It is a great advantage to students to have good modern lists to refer to, in which the figures and descriptions of ancient writers have been carefully revised, and when the figures are bad or the descriptions crude and indefinite, the names given to them are rejected, and not applied at random. See M. Guenée's introduction to his great work on "The Noctuæ of the World."

I have never taken kindly to the "Entomologist List." My knowledge of what had been done to clear up the nomenclature of our beautiful study, prevented me going back to the obsolete, indefinite, or variety names—given as specific—by ancient empirical writers, and when told I *must* use the "Entomologist List," by the Editor of the *Entomologist*, for all my communica-

tions to his book, I simply decline to communicate and give up his book. I have asked why I *must*, but have got no reply. When I sent a notice of captures the names were altered by the Editor to suit him, until I did not know my own captures, but after the sight I have had to-night of Mr. Cooke's magnificent collection in its present state I shall say no more. A more pitiable spectacle I could not conceive, as compared with the elegant, systematically natural and complete system by the great French Entomologists, Boisduval and Guenée, based as I said before upon the early stages of the insect, and followed by most, if not all, the British entomologists of note. I do not know one entomologist who has re-arranged his collection by the "go as I please list," and the sight of Mr. Cooke's collection to-night, at St. George's Hall, shows me I must avoid it.

Liverpool, 16th December, 1885.

ENTOMOLOGICAL RAMBLES.

No. 1.—CHINGFORD.

By E. ANDERSON.

Having arranged to meet several brother entomologists, who took the train at Liverpool Street, I strolled up to London-fields Station about 9 a.m., and caught the 9.15 train, in which I found a carriage full of entomologists all bound for Chingford. The weather was lovely—a bright sun and a gentle breeze, and we were full of hopes as to taking *Cardamines* and *Argiolus* upon such a favourable day. I may at once record that we did not see one *Argiolus*, and in my opinion it does not occur in the Chingford part of the forest. Upon alighting at Chingford we made our way towards the large oaks which skirt the forest, thinking that we might meet with *Hamula*. It was a somewhat difficult task to get to the place, as the ground was in such a dirty sloppy state; but entomologists are not in the habit of sticking at trifles, and after a series of flying leaps we assembled under the trees. After all, our efforts were fruitless, for we could not obtain a single specimen. We therefore pushed on to the forest proper, one of our party taking a male *Cardamines* upon the way. Directly we entered, exclamations of surprise broke from us in consequence of the filthy state of the ground, but that did no good, and we had to make our minds up for a dirty day's work. The first thing seen was *Jacobæa*, which Russell took. I took *Ferrugata*, then *Ægeria*, then *Jacobæa*, and in less time than it takes to write it we were all beating into the bushes and trees, and catching the various species as they flew out.

The party wandered off in different directions, leaving Russell, Smith, and myself together. and throughout the day we worked together away from the rest. We had not been very far when I dislodged a pair of *Derivata*, and succeeded in catching one of them, meanwhile Russell and Smith were doing well with *Cardamines*, but I could not obtain any. A little way further on Russell called out that he had seen *Maculata*, and I going to the spot turned up something yellow, but which had a very different flight to that of *Maculata*. I chased it as well as I could, and got near enough to see that it was *Aureola*, but I was unable to obtain it in consequence of there being such a lot of water in the spot. Upon regaining my companions I informed them what I had seen, as none of us were expecting to see *Aureola* so early. We therefore kept a sharp look out, and Smith a little further on said upon reaching a nice little nook, "Well this looks the sort of place for the footman," at the same time driving his stick into a bush he dislodged two insects, a fine female *Pulveraria*, which I immediately netted, while almost instantly afterwards Russell called out "I've got *Aureola*," and so he had a beautiful specimen too. A short time afterwards he took another, and after an interval I managed to get a specimen. All the time we were working away taking various species, amongst them *Temerata*, *Petraria*, *Ferrugata*, *Pulveraria*, *Ægeria*, and others, and as it was getting on for one o'clock, we made our way to "The Owl," where we had some ale and ate the provisions which we had brought with us. Mr. Edle, accompanied by several more, came in soon after us, and some more after them. One of the latter had taken a fine variety of *Cardamines*, the usual orange marking being replaced by a light tawny colour. It was in perfect condition, and Edle purchased it for 5s. After staying half-an-hour at The Owl, we sallied forth into the forest again. I saw a specimen of *Euphrosyne*, but could not catch it. A short time afterwards I made up for it by capturing a pair of *Alveolus* in magnificent condition, and as I very much wanted the insect I was much gratified. Russell had been going in at *Aureola* again, and had captured two more, making his total of this species four, while I had only one, and Smith had not any. But our turn was to come; for shortly afterwards I obtained a beauty, which I gave to Smith, as he did not have any; and as if to reward me for doing this I immediately took two more. Smith then took two himself, while Russell did not get any, though we were evidently in a good place for them. Then came a slack time, and we could hardly take anything. I took a fine *M. Ocellata*, but that was about all. We therefore emerged from the wood, and found ourselves in a field facing "The Woodman," and we proceeded slowly up to it; Russell, who was a little in advance, beating the hedge. The wind, however, carried all the insects towards Smith and I, and in this manner I obtained two

Aureola, and Smith one. Having arrived at the Woodman, we had a rest, and disposed of two pots of ale between us, and after our afternoon's work (for it was now about six) it went down very sweet. Another thing we obtained here was a good wash, and this made us quite fresh, so off we went into the forest again, thinking to get a lot more *Aureola*, as it was a beautiful evening; in this, however, we were disappointed, for strange to say we hardly saw any insects at all. Smith obtained one *Aureola*, I got two *Corylata*, and Russell got one so after knocking about for some we determined to go home and started off to the station; I taking *C. Spinula* on the way. We caught the 8.27 train nicely, and I was soon home. The condition of our boots and trousers when we had finished for the day was beyond description. I had mud up to my knees, and my feet were soaking wet owing to the water having come over the tops of my boots. But I soon changed my things, and after having eaten a good dinner I examined my captures. I found that I had 54 specimens comprising 21 species, seven of which were new to my collection. The following list shows the respective quantities:—6 *Aureola*, 2 *Corylata*, 1 *Spinula*, 4 *Pulveraria*, 1 *Derivata*, 1 *Badiata*, 1 *Cardamines*, 2 *Alveolus*, 2 *Ægeria*, 2 *Napi*, 8 *Ferrugata*, 1 *Ocellata*, 3 *Remutata*, 5 *Candidata*, 4 *Temerata*, 3 *Jacobæa*, 1 *Petraria*, 2 *Subtristata*, 3 *Maculata*, 1 *Pamphilus*, 1 *Punctaria*. I obtained 26 *ovæ* from a female *Pulveraria*. The larvæ in the forest were very plentiful but small. I did not bring any home.

No. 2.—CAVERSHAM WARREN.

By JOHN HENDERSON.

In these long winter evenings, a glance back at old note books will refresh the memory, and bring to mind a brighter state of things when insects were plentiful, and the Entomologist in his element. Probably no occurrence of late years has obtained such a hold on the minds of many observers as the extraordinary swarms of *P. Gamma*, in 1879, the summer in which *C. Cardui* was also very abundant. During four days in August of that year, with headquarters fixed at Caversham Bridge, near Reading, the writer was working the chalk pits and pine woods, of Caversham Warren, a long hilly ground on the Oxfordshire bank of Father Thames, extending nearly all the way from the pretty church of Caversham to Maple Durham House, the seat of the Blount family, whose ancestors frequently entertained King Charles I.

The soil is mostly chalk, and having a south aspect, the hills are very productive, in fact it was a well-known saying in Reading that all good insects could be found "in The Warren." Without going so far as that, I must say there were few empty boxes after a trip to that locality, however short,

and the following were taken on the days above mentioned:—Starting late in the afternoon of August 9th, we found *Cardui* alighting on the Teasel heads, and flying about freely in the second chalk pit, a mile or so down the road, near the ferry called Norfolk Scours, where the river widens considerably, but is very shallow. *Tithonus*, *Sylvanus*, *Linea*, and other *Diurni* were also common, the result of an hour's work producing ten sorts of butterflies. Everywhere *Gamma* were dodging about in the hedgerows, and threading their way between the tall waving grasses. Returning through the church-yard, a solitary *Wavaria*, with *Lithoxyloea*, and a male *Z. Æsculi*, were added to the contents of the collecting box, while later on in the evening, after an attempt at Roach fishing, which cannot be called successful, the net was again fitted out for a look at the lamps. *Sambucata*, *Aversata*, *Rhomboidaria*, a male *Potatoria*, *Nola Cucullatella*, *Bisetata*, and the irrepressible *Xanthographa* were found on the old bridge, but the dark windy night was not a favourable one. The next two days were not remarkable—about the same insects appeared, the weather gradually becoming hotter, until August 15th was a scorching day, when all hands were called from fishing for another expedition on the Warren. To describe the appearance of *Gamma* would be simply impossible, they were here, there, and everywhere, while a perfect swarm of *Cardui*, gladdened the sight. The latter were bright, fresh specimens, averaging nine females to every male, and a goodly series were duly captured. In a sheltered nook beyond the corn-fields, the hill side was glistening with the pale blue forms of *Corydon*, the males greatly predominating. Further away from the river, *Galathea* were abundant, along with the common Ringlet, *Hypcranthus*, the *Diurni* being twelve in number this time. Beyond *Mensuraria*, *Filipendula*, some larvæ of *Jacoleæ* on the ragwort, with a stray specimen of *Galiata*, *Bisetata*, *Unidentaria*, and a couple of fine Rose chafers, nothing further was bagged before 6 p.m. In the shades of evening, another walk was taken to the top of the high bank, close to Caversham church, where three handsome villa residences now stand. This was then a tangled patch of hazel, thorn, and other trees, a spot where I have taken the little Blue *P. Alsus*, the small Pearl Bordered Fritillary, (*Selene*), and an occasional *P. Atomaria*, which had evidently flown from the fir plantation a little further down the Warren. We had no lamps, but managed to see our game, while the light underwings of the moths were a little guide. A couple of weasels chasing each other were the first objects of interest—the little animals quickly disappearing down a rabbit burrow. The insects taken were mostly in good condition, *Cytisaria* (3) were, however, a little discolored, *Elutata* (common), *Apiciaria* (2), *Testata* (2), *Sociata* (common), *Trigeminata* (4), and *Auriflua*, were met with.

A couple of that beautiful noctua *T. Derasa*, next claimed our attention;

the Wood Swift (*Sylvinus*) was fairly plentiful, one *Janthina*, a worm *Pectinitaria*, 3 *L. Complana*, some *Illunaria*, the second brood and rather small, were also turned out of the cyanide bottle. Lighting up our little room, we quickly had our hands occupied, it was a "moth" night, and the room was soon full of *Grossulariata*, *Caja*, *Xanthographa* and other commoners. We got, however, one *M. Maura*, some *B. Neustria*, *L. Salicis*, *B. Perla*, and one *Cleora Licheuaria*; but the majority were slightly damaged from their vigorous attempts at cremation! There was nothing particularly rare taken during this river trip, but the species that did appear were unusually abundant.

Herne Hill, London.

PUBLICATIONS RECEIVED.

The Naturalist.

The December part of this magazine contains several items of exceptional interest, the occurrence of the Desert Chat (*Saxicola deserti*) in Yorkshire, in October last, is perhaps the most important, being the first British record of the species. The Spotted Eagle (*Aquila naxia*), is recorded as occurring in Northumberland also in October, this being the eighth British but first record Northern counties.

On Some Recently Discovered Insecta from Carboniferous and Silurian Rocks, by HERBERT GOSS, F.L.S.

Very great progress has been made in the study of Fossil Insecta during the last few years. In 1879, Mr. Goss read a paper on "The Insect Fauna of the Primary or Palæozoic Period." At that time "only 103 fossil insects were known from the Carboniferous rocks of the whole world, whereas at the present time upwards of 1,400 insects, from one European locality alone, are in the hands of M. Brogniart for determination and description." But not only has the number of known species been thus largely increased, many discoveries of great interest and importance have been made. Fossil insects have been found in older rocks than those previously known; additional types have been discovered, and some curious instances of what may be called connecting links have been detected. Thus *Dictyoneura Monyi*, a gigantic species found at Commentry, estimated to measure 70 centimetres (about 2 feet 4 inches) across the expanded wings, is allied to the *Orthoptera* by its body, and to the *Neuroptera* by its wings. Others are more or less intermediate between the *Neuroptera* and *Hemiptera*, We conclude our

brief notice of this interesting paper with the following extract, which will probably interest our young readers:—

“According to present discoveries, the *Insecta* are the oldest class of land animals; the *Orthoptera* or *Orthopteroid Palæodictyoptera*, the oldest known order of insects; and the *Blattidæ*, or their ancestral equivalent, the oldest known family of the *Orthoptera*. That the oldest known *Orthopterion* should be a *Blatta* or its ancestral representative, is in direct accordance with the conclusions as to the origin and genealogy of insects, arrived at by Packard, from the study of the embryology of the class.”

The Natural History Journal and School Reporter, 15th Dec., 1885.

This Journal, which has already reached its ninth volume, is vastly superior to any other of its class that we have seen. The present number contains, among other items, an interesting account of a Trip to Eastern Iceland, and another of the great Star Shower of November 27th, illustrated by a diagram showing the radiant point and the meteors observed at 7.30 p.m. Among the more interesting notes we observe that a Mediterranean shell *Helix lactra* was picked up at Filey, on the Yorkshire coast, on August 5th. It contained a snail only recently dead. Also that a Storm Petrel was caught at Soho, Birmingham, on September 19th.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meetings recently have been chiefly occupied with business relating to the working of the Society during 1886. On November 26th, the President exhibited a female specimen of *H. abruptaria*, bred the same day; the pupa had been kept in the ordinary way and not forced. On December 10th, Mr. Lewcock shewed ten species of the genus *Silpha*, including one variety; and Mr. Anderson brought up a dark suffused form of *H. aurantiaria* taken at Epping Forest. On December 17th, Mr. McDonald brought up a specimen of a beetle, which is rather common amongst foreign timber, being known familiarly amongst the dock labourers as the “Timberman,” it is chiefly found amongst Norwegian shipments, and at certain times of the year as many as six or eight may be taken in one day; he also spoke of the quantity of *Sirex gigas* sometimes observed in the same situation. The discussion was upon *V. atalanta*, the subject being opened by Mr. E. Cooper, who, after an exhaustive account of its life-history, drew attention to its nocturnal habits, it having on several occasions been observed at night time, he himself having taken it at sugar. Mr. Pearson taking the subject up thought that if this could be proved it would have a very direct bearing on the theory of migra-

tion, for which this species by its strong build and rapid flight is so admirably adapted. Many members, however, mentioned on the other hand, the attachment these insects evince for certain spots, returning again and again after having been disturbed.—ERNEST ANDERSON, Secretary.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

The Annual Exhibition of this Society was held on December 3rd, and proved very successful, the room being well filled with interesting objects relating to Natural History. The Lepidoptera evidently claimed the most attention from members, but a very fine lot of Coleoptera were on view, and also interesting exhibits of Botany, Conchology, Hymenoptera, &c. Material help was rendered by the South London Microscopical Society, who brought up a good number of microscopes and slides.

NOTES AND OBSERVATIONS.

LARVÆ IN 1885.—The past season has been unusually productive in larvæ. The following have occurred within fifty yards of this house: *S. ocellatus* (1), *S. populi*, *S. tilia* (2), *E. jacobea*, *A. lubricipeda*, *A. menthastri*, *L. auriflua*, *O. antiqua*, *H. wavarica*, *M. margaritata*, *C. elinguarica*, *M. fluctuata*, *A. grossulariata*, *D. bifida* (1), *P. bucephala*, *A. tridens* (2), *A. psi*, *A. aceris*, *A. megacephala*, *H. oleracea*, *M. brassica*, *M. persicaria*, *P. meticulosa*, *H. chenopodii*, and others we have not been able to distinguish.—J. HENDERSON, 58, Romola Road, Herne Hill, S.E.

THE HORNET IN NORTHUMBERLAND.—I had Mr. Sang staying with me for a few days in the autumn. One fine warm day we met with a Hornet, resting on a brick wall, near my house. Mr. Sang attempted to box it, but it was too sharp for him. I have never heard of this wasp being found so far north.—W. MALING, Newcastle-on-Tyne.

THE GREAT NORTHERN DIVER AT HARTLEPOOL.—A fine specimen of this rare bird was obtained here about the middle of this month. It had been seen more than once, and was observed flying across from the slake to the sea, pursued by some boys with catapults. Eventually it was taken on the North Sands and is now in my possession. It is in fine plumage of the second year.—JAMES DIXON, Hartlepool, Dec. 24th, 1885.

TO CORRESPONDENTS.

D.K.A., CONGLETON.—You can have the parts containing plates of Coleoptera separately, but not the plates alone.

The YOUNG NATURALIST:

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NOTES ON THE GEOLOGY OF SURREY.

By GEO. E. EAST, JUNR.

FEW districts of equal size offer such varied Geological attractions as the county of Surrey. From the old Wealden clays and sands in the south we pass to the chalk ridge in the centre, on whose northern slope lie various Tertiary strata; to this alternation of rock masses of varying composition and hardness is due the charming scenery for which many parts of Surrey are famous, and which those who understand the geological features of the district are best fitted to appreciate, for they have a knowledge of the cause as well as of the effect. The oldest rocks of Surrey lie in its south-east corner, and as we pass northwards from this point we continually pass over the edges of newer and newer strata. All the beds dip or incline to the north, and rest one upon the other, and consequently the latest formed rocks are those of Bagshot Heath in the north-west. The most natural order of description seems to be to commence with the oldest deposit, and then to take the others in ascending order. It is my intention in these few short notes simply to mention the different formations as they occur, and in some cases to give a list of the fossils found in them, and I trust they may be of interest to some of my brother naturalists who are readers of the "Young Naturalist."

THE WEALDEN SERIES.—The lowest Wealden strata are the Hastings Beds, and occupy very little of Surrey, just in the south-east corner. We find them to be beds of sand and clay, lying between East Grinstead on the south and Lingfield on the north, and reaching westward to Cophthorn Common not far from Burstow.

THE WEALD CLAY.—This blue or brown shaly clay occupies a tolerably large area, it forms the tract of comparatively flat land, which extends from the neighbourhood of Chiddingfold, on the west by Cranley, Ewhurst, Charlwood, and Crowhurst eastward, and it attains its maximum thickness

near Leith Hill, where it is about 900 to 1000 feet thick. Among its organic remains have been discovered :—

Earlswood Common.

Lepidotus Mantilli.

Charlwood.

Remains of *Iguanodon.*

Oakwood Hill near Ockley.

Remains of *Megalisaurus.*

Horley.

Cyclas media, Unio, Sphærium.

THE LOWER GREENSAND.—Beds bearing this name form the well-marked line of hills, which, with one or two gaps, bounds the plain of Weald clay on the north and west. Several sub-divisions have been traced in the Lower Greensand, thus at the base, resting on the Weald clay, we have a band called the Atherfield clay and upon this we find the Hythe beds composed of sands and limestone. The sandstone beds are irregular and of local occurrence, they are clayey sands, which near Nutfield contain excellent beds of Fuller's Earth; this substance is an earthy hydrous silicate of alumina, it has a great capacity for absorbing oil or grease, and was largely used by cloth manufacturers. The chief organic remains are :—

Reigate.

Exogyra spicata, Terebratula sella, Holocystis elegans, Pleurotomaria Anstedi, Ammonites carteroni, A. Nutfieldianus, Perna mulleti.

Red Hill.

Perna mulleti, Pinna sulcifera, Arca dupinana, Astarte substriata.

Nutfield.

Nautilus undulatus, N. Neocomiensis.

Godalming.

Terebratella proelonga, Terebratula oblonga, Terebratulina striata.

East Shalford.

Terebratula sella, Anomia radiata, Pecten quinquescostatus, Arca consobrina, A. dupiniana, A. robinaldina, Cardium Ibbetsoni, C. Austeni, Corbis corrugata, Astarte acuta, Cyprina anglulata, Cytherea parva, Venus orbigniana, Venus striato-costata, Corbula striatula, Panopiea plicata, Gastrochæna dilatata, Nucula antiquata, Avellana globulosa, Turbo munitus, Aporrhais robinaldina, Cerithium Neocomiense, Eulima albensis, Natica lævigata.

Haslemere.

Perna mulleti, Lucina arduanensis, Cyprina cordiformis, Gervillia alexformis, Arca raulini.

THE GAULT.—This formation occurs in the neighbourhood of Bletchingly and Shalford, and is a dark blue marl. Its chief fossils are:—

Bletchingly.

Rostellaria carinata, *Ampullaria caniculata*, *Belemnites minimus*, *Ammonites splendens*.

Shalford.

Dentalium decussatum, *Ammonites lenettica*, *A. interruptus*.

Richmond.

Hamites armatus, *Ancyloceras spinigerum*, *Ammonites splendens*, *A. splendens*, *A. rostratus*, *A. Bouchardianus*, *A. interruptus*, *Inoceramus concentricus*.

THE UPPER GREENSAND.—This formation consists of green sandy beds, and light coloured calcareous sandstones, and is about 20 ft. thick.

THE CHALK.—Every one is familiar with the smooth rounded outlines of the Chalk downs, and with the white soft limestone which composes them. The lowest Chalk beds are marly, whilst the highest contain numerous nodules and layers of flint, of which the middle portion is nearly destitute. The total thickness of the Chalk in Surrey is about 500 feet. Its chief fossils are:—

Purley.

Ananchytes ovata, *Holaster pillula*, *Micraster cor-anguinum*, *Cidaris sceptrifera*, *C. clavigera*, *Terebratula carnea*, *T. semiglobosa*, *Terebratulina striata*, *Rhynchonella limbata*, *R. plicatilis*, *Corania Ignabergensis*, *Inoceramus undulatus*, *I. Cuvieri*, *Pecten nitidus*, *Limia Hoperi*, *Spondylus spinosus*, *Ostrea Normaniana*, *Pleurotomaria perspectiva*.

Riddlesdown.

Holaster planus, *Micraster cor-anguinum*, *Cidariss ceptrifera*, *Terebratula carnea*, *T. semiglobosa*, *Terebratulina striata*, *Rhynchonella limbata*, *R. Mantelliana*, *Corania Ignabergensis*, *C. Parisiensis*, *Thecidium Wetherellii*, *Inoceramus striatus*, *Spondylus spinosus*, *S. latus*, *Ostrea vesicularis*, *Oxyrhina Mantelli*.

Kenley.

Ananchytes ovata, *Holaster planus*, *Micraster cor-anguinum*, *M. cor-bovis*, *Terebratula carnea*, *T. semiglobosa*, *Terebratulina striata*, *T. gracilis*, *Rhynchonella Mantelliana*, *R. plicatilis*, *Inoceramus striatus*, *I. Cuvieri*, *Spondylus spinosus*, *Pecten quinquecostata*.

Marden Park.

Galerites (Discorda) subriculus, *G. castanea*, *Terebratula semiglobosa*, *T. obesa*, *Terebratulina striata*, *T. gracilis*, *Rhynchonella limbata*, *R. Martini*, *Inoceramus Brongniarti*, *I. mytiloidis*, *Pecten Beaveri*, *Lima globosa*, *J.*

elongata, *Cardita tenuicosta*, *Pleurotomaria perspectivā*, *Solarium granosum*, *Nautilus Deslongchampsianus*, *Ammonites varians*, *A. subplana*, *A. subtuberculata*, *A. navicularis*, *Scaphites æqualis*, *Belemnitella plena*.

Dorking.

Trigonia aliformis, *Belemnitella quadrata*, *Ammonites Austeni*, *A. perampus*, *A. curvatus*, *A. splendidus*, *Micraster cor-anguinum*, *Serpula antiquata*, *Rhynchonella Mantellana*, *Terebratula semiglobosa*, *Galerites æbogalerus*, *Serpula plexus*, *Ptchodus discurrens*, *P. latissimus*, *Otodus appendiculatus*.

Guildford.

Pecten Beaveri, *Ammonites Mantelli*, *Anavicularis Sussexiensis*, *Nautilus radiatus*, *N. elegans*, *N. undulatus*, *Terebratula globosa*, *Inoceramus mytiloides*, *I. pictus*.

Mickleham.

Marsupites Milleri.

Godstone.

Plagiostoma spinosum.

THE TERTIARY EPOCH.—The Eocene Tertiary strata of North Surrey form part of the beds which constitute the southern half of the London Basin, so called because the beds have a dip towards London, both on the south and north, the first of these are

THE THANET BEDS.—These are composed fine sand, and it might almost be said are unfossiliferous, although *Ostrea* have, I believe, been found in the Beddington district.

THE WOOLWICH AND READING BEDS.—These beds are composed of mottled clays and sands and their chief organic remains are—

Dulwich.

Cyrena Dulwichienis, *Melania inquinata*, *Bulimius ellipticus*, *Pitharella Rickmanni*, *Paludina lenta*.

Peckham.

Ostrea tenera, *O. pulchra*, *Cyrena cuneiformis*, *C. semistriata*, *Pitharella Rickmani*, *Paludina lenta*, *Cerithium funatum*, *Unio Deshayesii*.

Park Hill.

Ostrea, *Bellovacina*, *Cardia*, *Nucula*, *Melania*, *Pholadomyæ*, *Cyrenæ*, *Paludinæ*, and remains of *Coryphodon*.

OLDHAVEN BEDS.—These are sandy, with flint pebble beds, and are less than 20 feet thick; they are exposed on Thornton Heath, Shirley, and Addington.

THE LONDON CLAY.—This formation occupies a large spread of surface, running from Leatherhead and Croydon, up to the Thames, and extending westward by Stoke, past Aldershot; it is a stiff brownish clay, and contains layers of septaria or cement stones, which are nodules of impure carbonate of lime. Its chief organic remains are:—

Wandsworth.

Nautilus imperialis, Aircula media, Cardium Plumsteadiense, Corbula globosa, Ampullaria, Modiola elegans, Pectunculus decussatus, Cassis carinata, Solarium conoideum, Pholadomya intermedia, Rostellaria, Murex trilineatus, Natica glaucinoides, Cancer Leachii.

Richmond.

Ditrupea incrassata, Pholadomya margaritacea.

Kingston.

Cytherea obliqua, Phorus extensus, Rostellaria ampla.

THE BAGSHOT BEDS.—These consist of fine light coloured sands, and upon them rest the Middle Bagshot or Bracklesham Beds, which are clayey. The fossil remains are of rare occurrence in Surrey.

ALLUVIAL DEPOSITS.—These are beds of gravel and brick earth, which have been deposited by the rivers during flood-time or in shifting their course. In the gravels along the course of the Mole, bones of the Elephant and the Rhinoceros have been found.

PRE-HISTORIC MAN.—Of the older or Palæolithic stone implements, the only record is one grey flint found in gravel at Peasemarsch between Guildford and Godalming. Of the Neolithic or Polished Stone age, specimens of celts or axe heads, have been obtained from the Thames at Battersea, from Coway Stakes near Egham, Kingston-on-Thames, and Titsey, one fashioned out of greenstone was found deep in the clay whilst digging for the Chelsea water-works at Kingston. A perforated piece of granite, intended probably for use as a hammer head, was found at Titsey Bark, and one of quartzite near Reigate, Red Hill; near the latter town is a famous place for flint flakes or knives; some thousands have been collected here. Flint arrowheads have been found at Lingfield, Mark Camp, and at Chart Park, Dorking, &c.

YOUNG NATURALIST'S POSTAL EXCHANGE
CLUB.

I am exceedingly desirous to increase the usefulness and extend the area of this club. While those who have been members of it, have been

unanimous in expressing their satisfaction with its results, I am of opinion that the club has not by any means, had an opportunity of showing what it could do, and if readers will kindly pardon the early recurrence to the subject on account of its importance, what may be done by it shall be briefly pointed out. Though the mode of working it was explained in the Magazine only a month or two ago, it is necessary briefly to recapitulate it. The club is divided into sets of ten members, for each of whom a small box is provided, ten of which are securely packed in a larger box. This travels from member to member by Parcel Post, at a cost of only 6d. per journey. Each member places in his own box what duplicate insects he pleases, in any order, taking in return from the other nine boxes whatever he may find useful to him. All insects must be well set and in good condition, except that "type specimen," of really rare species, may be sent. No other restriction is made except that Lepidoptera, "common everywhere," are not to be sent unless asked for, or when they bear some local or other peculiarity. One clear day is given to each member for examination of the contents of the box, or in other words, he must send it off on the third day, counting the day he receives it and the day he despatches it as one each. It thus makes a round in about a month.

Such a club as this was not practicable unless on a very small scale, prior to the Parcels Post. The cost of, and risk in transmission before this, was much too great. Let me now show the advantages it has as at present carried on, and what it is capable of being made. Every member, once a month, has the opportunity of examining nine boxes of insects from various places, and selecting from their varied contents whatever may be useful to him. Even of common species he thus obtains forms quite new to him. During last year I obtained specimens of *Selenia illunaria* that were strikingly different from any I had seen, and yet were the ordinary form where they had been obtained. Of course, when such as this occurs, the first recipient does not take all there are. He will take a pair or so, and mark in the note book that accompanies the box, the peculiarity he has noticed, and express his desire for further specimens, which he will probably receive next round, thus affording others the opportunity of seeing the insects that have struck him as noteworthy, and obtaining other opinions upon it. Again, we all know that among Entomologists, Lepidopterists bear the largest proportion, and Coleopterists next, while the other orders receive but a scanty share of attention. Still collectors like to set an insect or two that takes their fancy, though not of the order they keep. By this club all such specimens can be made useful, for it includes not only collectors of these two favoured groups, but of Diptera, Hymenoptera, &c. I have thus sent

out Bees and Flies that were filling my boxes to no advantage, and they have been taken by those who valued them. I have also received a considerable number of type specimen in various orders, named, the value of which I have already found. As such a club gains in members, the various "sets" can be so altered as to bring into regular exchange with each other, those whose tastes are most nearly allied, while there would still be scope for sufficient change in the circuits to give every one an opportunity of continually seeing insects from fresh localities. By sending lists of desiderata and duplicates to the secretary, he could bring into communication those who could assist each other most in each different order, and thus with constant change would be continued advantage for every one. These are chiefly "exchange" advantages, which are not the most important. I have already mentioned that the club brought under my notice a local form of *S. illunaria* I had not previously seen. This is not by any means the only instance of the kind, but it is enough for illustration. Such specimens are duly commented on in the "note book," and the attention of all the members called to them. If they are new to all, we thus learn they are apparently peculiar to the locality. If, instead of that being the case, they prove common to every one, then the first recipient will have reason to believe the form he takes to be something unusual. In either case the advantage is the same, and the knowledge gained, the direct result of the club. With named varieties equal advantages accrue. Many very distinct forms of various species bear names that are little known or used in Britain, and though British insects vary much more in proportion than do Continental ones, yet there are more named forms known there than here. The fact is Continental collectors have paid more attention to local variation than we have, with all our advantages, and their writers have described and named these forms freely. Here and there in Britain a collector has given special attention to these points, and when such an one belonged the club he would greatly benefit the others by naming for them the local forms, &c., that he found in their boxes. Besides naming varieties, such a club affords opportunity of having unknown species correctly named. Several cases have already occurred where duplicates were sent out wrongly named, and the nomenclature was quickly corrected. Specimens are also sent round specially to be named, returning in due course to the owner with the name and any comments likely to be interesting.

Much more might be said, but readers and members must find out the rest for themselves. My special object is to appeal for additional members. Only two sets are filled up, and a few additional names for another. I am pre-

pared to place the second or third page of the cover of the Magazine at the service of the club, and any notes of special interest would be inserted in the Magazine itself, but several more than two sets of members are needed to make it work well. The Postal Microscopic Society, with an entrance fee of 5/- and an annual subscription of 10/-, and not nearly so many advantages has now 13 circuits in full work. Why should the Postal Exchange Club not exceed that number before long?—JOHN E. ROBSON, Hartlepool.

CONCOLOGICAL JOTTINGS.

BY ALBERT H. WATERS, B.A., M.C.S., &c.

(Continued from Page 6.)

I think the *Chitons*, or Coat of Mail shells very curious molluscs. It seems extraordinary that a shell should be so cunningly contrived that the creature inhabiting it is able to roll itself up like a hedgehog, or like one of those "pill-millepedes" which are so abundant underneath damp, decaying logs. *Chitons* are very common on rock-strewn beaches, and may be easily found by turning over the stones. At Hunstanton I find them most frequently under the flat pieces of chalk which lie below the level of high water mark. They do very well in my aquaria and live a long time, often obligingly crawling on the glass so that they can be easily examined with a lens. The species I have had under observation in my vases—for I generally keep them in vases—are *Chiton cinereus*, *Chiton assellus*, and *Chiton fascicularis*. I have not yet noticed any particular difference in their habits. All are constantly engaged in eating the minute confervoid growth which soon makes its appearance on the glass and rockwork of a marine aquarium, and when they crawl on to the former they keep it beautifully clean without any trouble to me.

Among the other Gasteropoda I have had in my aquaria are the "Top" shells and Limpets. The species I have had are *Trochus zizyphinus*, *Trochus cinereus*, and *Patella vulgata*. I have not had any of them breed and have nothing particular to record about their habits, except that they are fond of being a good deal out of the water. I have found empty shells of *Trochus millegranus* on the Norfolk coast of the Wash, but have not had the living animal under my observation.

I have had several other living univalves from the Western shore of the Wash, as well as other localities, but as I have nothing very particular to

write about them I will not take up space by a mere list of names, especially as I hope to give a complete list of the mollusca of the bay on a future occasion. I will, therefore, say no more, at present, about the Gasteropoda of this region.

I intended confining this paper to the univalves of the Wash but I cannot forbear mention of one or two of the Conchifera.

The Razor shell (*Solen ensis*) abounds, but I have experienced a difficulty in getting specimens small enough for my aquaria, and large ones do not thrive well at all. I keep specimens of the common cockle (*Cardium edule*) in broad earthenware pans, half-full of sand, and with just enough water to cover the latter and no more.

From Cockles to Mussels is a natural transition. Although I cannot keep adult specimens of the common edible mussel (*Mytilus edulis*) alive for many months, young individuals are constantly making their appearance in my aquaria, and live for a tolerably long time. They attach themselves to the glass at the very surface of the water, in which they lie half in and half out. They by no means remain persistently at one spot, but often capriciously shift their quarters. I have known individuals to travel in a few weeks more than once round a vase, whose circumference was over four feet. They usually choose night for their travels, but I have seen them on the move in the day time also. Their mode of progression is interesting too although it is tediously slow.

Mussels are very common at Hunstanton, and there are extensive beds of these edible molluscs, so relished by many people. Although cart loads of them are daily gathered for transportation inland, and excursionists carry away a large number, they do not seem to suffer any diminution. There are always thousands of young ones growing up to replace the larger individuals which have literally "gone to pot," and from observation of the specimens in my aquaria they appear to grow very fast. They have other foes beside their human ones; Starfish and Dog Whelks destroy a good many, and the former must work no inconsiderable havoc among them. Wherefore, those who get their living by gathering the mussels ought to be profoundly thankful to all naturalists who visit the beds for collecting purposes, and, like myself, carry off for purposes of dissection or preparation for the cabinet all the specimens of *Uraster rubens* and *Nassa incrassata* they can lay their hands on.

There are many other bivalves of which I might make mention, but I will omit them, and bring these gossiping notes to a close as far as marine mollusca are concerned. In future "Conchological Jottings," I will say something about the land and fresh-water shells of Cambridge, which are, I believe, at present, undescribed.

By a printer's error on page 6, line 7, I am made to describe a variety of *Littorina littoreus* as having "fine broad black bands," it should have been "five broad black bands." Probably the misprint was obvious to most readers, but will those who have not before noticed it, kindly make the necessary alteration in their copies?

Cambridge.

VARIATION IN LEPIDOPTERA.

INTERMEDIATE FORMS.

By JOHN E. ROBSON.

It is always a pleasure to me when a subject, in which there is room for difference of opinion, is taken up and debated in these pages. No scientific question can be discussed in such a way without both sides learning more or less from the other. In the various papers I have given to my readers during the last six years, I have had two objects chiefly in view—To tell the facts I had learned, and to discuss the opinions I had formed. I have made no claim to be deeply learned in Entomological Science, but in a plain way have endeavoured so to express myself that my younger readers would understand me. Though I have written on Evolution, Reversion, and kindred subjects, that are not perhaps understood by every one, I have always flattered myself that I made myself intelligible even to Young Naturalists. It is evident, however, that for once I have failed. My paper on "Intermediate Forms," at page 209, of the last volume, has not been understood by every one. Mr. Gregson's reply at page 251 is not the only communication I have had on the subject, though the only one for publication. In replying to Mr. Gregson I will endeavour to make it clear what I really meant; yet I must confess (if Mr. Gregson and my other critics will excuse me), I fail to see, after carefully reading over my paper again, how I have been so much misunderstood.

Mr. Gregson says (p. 251) "I will write out a number of species from my own knowledge, so that the readers may judge for themselves as to whether there are species which produce intermediate varieties or not." This certainly implies that my argument was that intermediate forms did not exist, whereas my point expressly was that there were intermediate forms, but that in certain cases where there were "two well marked forms of an insect, whether sexual or otherwise, the absence or rarity of intermediate forms seems to require explanation." My arguments as to sexual variation Mr.

Gregson does not notice, yet this is a very important element in the case, but it is one of such common occurrence that we seem to pass it by as a matter of course, and never enquire as to the reason. There are really two important elements in it, first the cause of the sexes differing, and second the absence of intermediate forms. Why should there be more spots on the wing of a male *Pieris brassica* than on a female; and how is it that the male never approaches the markings of the female or *vice versa*. We have a common butterfly *Thecla rubi*, in which the sexes are alike; then we have another equally common *Zephyrus quercus*, so closely allied to the first that they are generally included in the same genus, but in the latter species the sexes differ, and always differ. Surely there must be some reason for this, and in species so nearly allied one might expect that sometimes a departure from the rule would take place. Mr. Gregson is not the man to shirk an argument because it tells against him, and I cannot understand how he passed over the strong point made of the absence of intermediate forms when the sexes differ. Our own *Papilio Machaon*, has the sexes alike, but I instanced others of the same genus in which not only the sexes differ, but in which there was more than one form of the female and still no intermediates. One of my illustrations was the North American *Papilio Turnus*, and I pointed out that North of Latitude 37° the sexes were alike; that South of Latitude 42° the sexes were so different that the female had long been considered a distinct species; and further that in the zone between these latitudes both forms occurred and had been bred from one batch of eggs. Now surely an important matter like this ought not to be passed over in silence when the question of intermediate forms is discussed. Sexual variation is as important, or perhaps more important than any other, and though there may not be exact similarity between the cases of sexual and non-sexual variation, to ignore sexual variation altogether will certainly not help us to an understanding. I may be mistaken in asserting that where the sexes differ, there are no intermediate forms, but I ask Mr. Gregson or any one else, to point out a case to the contrary, and I ask further, if there are no such intermediates, or if there are but very few, why is it so?

Leaving sexual variation I would point out that even with species Mr. Gregson refers to, I specially named intermediate forms as existing. Of *Betularia* for instance, Mr. Gregson says "*Betularia* has every intermediate variety from nearly white to deep rich coloured brown or black; in my two long rows of it, they run imperceptibly into each other." My reference to the species was as follows: "Black *Betularia* (*Doubledayaria*) are by no means rare and are easily reared. But though I have bred a goodly number of it, all that ever I obtained were either one form or the other, either true

Betularia or true *Doubledayaria*. Intermediate forms of this species do, however, exist, but they are so rare that I never took but one, and never saw but two." I venture to ask Mr. Gregson from how many specimens were his long series of intermediate forms selected. Every one knows that a good collection is by no means a fair illustration of the natural condition of a species. The ordinary forms of all but really rare insects can be obtained in a comparatively few years, then the process of selection begins, and by purchase, by exchange with beginners who care more for quantity than peculiarity, and by occasional capture we gradually accumulate a number of abnormal forms out of all proportion to their ordinary occurrence. In my series of about a score of *Betularia* I have two intermediate forms, but I have had hundreds of the species through my hands, of which these two were the only intermediates. I have bred *Betularia* from eggs deposited by a black female, and also from a grey female that paired with a black male. In both cases I obtained black insects and grey ones, but no intermediates. This is the special point to which I call attention. Mr Gregson raises a question of great importance that I have never seen discussed; *the food of the plants* on which the larvæ feed, and he argues that the effect of the food plant in producing variation, depends upon the soil from which the plants draw their own food, to call it so. This is well worth following up, and will probably help us to an understanding of some of the difficulties, but it cannot affect the question I raise. Why should *Papilia Turnus* have a different female in the Southern parts of North America to what it has in the North, while the males remain alike; and why, even in the intermediate zone, are there no intermediate forms? Why again should *Betularia* produce both sexes of both forms from one batch of eggs, and intermediate forms so very rarely? Till these questions are replied to, I cannot see that Mr. Gregson has even touched my argument.

It may be that the nature of the soil on which plants grow has something to do with variation. I do not know the evidence on which Mr. Gregson bases his assertion, but if I understand it right, it is that dark varieties are produced by plants grown on older geological formations. This, however, is clear, that the food of the larvæ, wherever grown, is not the only agent at work in producing variation, and also that it has not always the same effect. Two larvæ from the same batch of eggs and fed on the same plant will produce insects differing from each other in some cases, while with other species, difference in food does not appear to have any effect. My enquiry was not in this direction, but admitting that some cause produced variation, I tried to show that some other cause was at work to render such variation permanent. This has been effectually accomplished in

cases of sexual variation, and almost as effectually in many cases not sexual. It is quite true that by careful selection from a very large number of examples, a series of *Betularia*, or perhaps of any other species with a well marked variety, may be obtained in which are every possible gradation from the ordinary type to the variety. But this proves nothing. If Mr. Gregson's series of *Betularia* varies from pure white to perfect black, through every possible gradation, I ask what proportion did the type and the black form bear to the intermediates? Here is the issue between Mr. Gregson and myself. It is not one of fact, but of the application of the fact.

YET AGAIN, CALIMORPHA HERA.

By JOHN E. ROBSON.

“And in the lowest depth, a lower depth
Still threatening to devour him, opens wide.”

It would really seem as if *Calimorpha Hera* were as bottomless a subject as that written of by Milton, but my desire that “Young Naturalists” should have their eyes open must be my excuse for returning to it again. I thought I knew all that had been done in attempting to palm off *Hera* as British, but it was not so, and my friend Mr. Walker, of Chester, has called my attention to a former “capture” of *Hera* that must be noted here, as every tittle of evidence helps to make the case stronger. Mr. Walker writes:—

“I have just read your article on “*Calimorpha Hera*.” Has your attention been called to a recorded capture by a Capt. Russell in 1859? (See *Zoologist*, 1862, p. 7912.) The gallant Captain, who it is stated *did not know the difference between a moth and a butterfly*, was a remarkably fortunate man, for he not only took 5 specimens of the above species (*Mr. Brooks has got a dozen of them.—J.E.R.*), but a specimen also of *Eulepia grammica*, at the same place. He also took 7 specimens of *Argynnis lathonia* the following month (August 1859) at Lavenham, Suffolk, a specimen of *Anescychia escharella*, at Chelsworth, in 1861, and one of *Papilio podalirius* at Sevenoaks!! All the above were exhibited at a meeting of the Entomological Society, February 3rd, 1862.”

It scarcely seems necessary that I should add to the above. It tells its own tale tolerably well. But there is a moral to be drawn from it too. There is a north-country saying when a cook is told not to “over-egg” her pudding, that might be applied to all these innocent people who know nothing whatever, but take very wonderful things. When *Argynnis Niobe* was so

successfully palmed on Doubleday, Newman, Stevens, and others, the swindlers could not be content. Newman promised to figure *Niobe*, but after several months had gone he explained that he since doubted the genuineness of the captures, and had suppressed the figures, &c., promised, as he had also suppressed communications announcing the capture of *Daplidice*, *Lathonia*, and a round dozen of *Podalirius*. They could not be content with the brisk trade doing in British *Niobe*, they "over-egged" the pudding. *Daplidice* was possible, *Lathonia* was also possible, but the two together not likely to fall into the hands of the finder of *Niobe*, but when *Podalirius* was said to be taken also the game was up. Some people can swallow a great deal. *Processionea* went down easily, the crow's nest story was so simple. It could not be a lie. But when Mr. Batchelor began to offer *Sacraria* and *Purpuraria* in addition to *Daplidice* and *Lathonia*, why he too "over-egged" his pudding and spoiled his market. Mr. W. Brooks may not be the individual who planted *Hera* at Starcross, but he had better not have "taken" *Artemisia*, if he too did not want to "over-egg" his pudding. But there is a very ugly question asked about Mr. Brooks in last month's yellow magazine, which, if he cannot answer satisfactorily in the negative, will dispose of *Hera* for a long time to come.

PUBLICATIONS RECEIVED.

"Climatic Causes affecting the Distribution of Lepidoptera in Great Britain," by A. O. WALKER, F.L.S.

This little pamphlet, reprinted from the "Proceedings of the Chester Society of Natural Science," is most interesting to us, and confirms the view that it is our cold and sunless climate, with its superabundant moisture, that causes butterflies to be so scarce in our Island. Mr. Walker shows conclusively that butterflies are more abundant in the East of Britain than in the West; and that the difference is specially to be noticed if we travel from the South-east to the North-west. He shows that of the 63 butterflies occurring in Britain, "excluding the extinct *Hippothoe*," 57, or over 90% occur in the South-eastern and South-midland Counties, and the Eastern Counties (Essex, Suffolk, and Norfolk) have 56. The South-western (Wilts, Dorset, Devon, Somerset, and Cornwall) have only 52, though they have a much more genial winter climate; and the Chester district, in which he includes the Welsh counties of Flint and Denbigh, has only 37 or less than 59%. He also observes that the same rule obtains on the Continent. Belgium, for instance,

having only 94 butterflies, while Silesia has 124. To account for this he quotes meteorological statistics, from which he educes two facts, viz. :—

“1. That the West of England has a moister atmosphere and greater rainfall than the East.

2. That the day temperature in summer increases rapidly from N.W. to S.E.”

He then contends that having shown that the number of butterflies increases rapidly as we go from N.W. to S.E., he is justified in considering there is a direct connection between the two sets of facts.

Mr. Walker also shows that the discrepancy between East and West is still greater if tree feeders only are considered, and argues that “insufficient ripening of the wood of trees and shrubs from want of solar heat would produce a condition in the leaves injurious to the health of the larvæ.

The paper concludes with a very brief reference to Nocturnal Lepidoptera, which appear to be affected by the same causes, but not to the same extent.

“The Journal of Microscopy and Natural Science.”

Part 17, January, 1886.

From our particular standpoint the part for the current month is the best yet issued of this periodical. The article that attracts our special attention is the one on “The Mouth Organs and other characteristics of the British Geodephaga,” by Robert Gillo; but there are several others of almost equal interest to us, altogether apart from Microscopy. In fact, the part might be called an Entomological number. We could not give a condensation of Mr. Gillo’s valuable paper, but recommend it our readers. It is illustrated with three plates of beetles and details of their mouths and feet. A letter from Maori-land, and a paper on Fresh Water Algæ are both of considerable interest. No one will begrudge the eighteenpence if they order this part.

We observe the promised “Scientific Enquirer,” a new journal, also under Mr. Allen’s editorship, is now promised for 1st February.

NOTES AND OBSERVATIONS.

NOTE ON ENTOMOLOGICAL ADVERTISING.—In October, 1885, I sent a notice to the *Entomologist*, that I should be “At Home” to Artists and Entomologists on every Sunday from November, 1885, to March, 1886, and received a note to say I must remit three shillings and sixpence for it as an advertisement, before it could be inserted in that serial. “Three and Sixpence” to let my friends and the public know that I was willing to give up my time gratuitously in the interest of science! It struck me, perhaps, the

owner of the *Entomologist* is going to change things, going to charge as advertisements the various notices of captures by insect dealers (and he thinks me one), so I looked forward to having fewer of these pseudo-advertisements for the future in our magazines (inserted free.) What then has been my surprise to see time after time notes inserted which appear to have no other object than to show to customers where they can be supplied with certain insects, not when and where and by what process amateur entomologists can take them. Perhaps the longest advertisement of the year of this kind appears in the "Green" magazine. The result of my observation of these articles in our magazines is that I think it strange my notice to open my collections to students, so as to advance science, should have to pay as an advertisement, whilst notices which seem to me only intended to advance individual profit should be admitted to our magazines duty free, and I said—O Editors, how inscrutable are your ways, how sharp you are; you are veritable razors of science!—C. S. GREGSON, Liverpool.

NOTES ON LEPIDOPTERA, taken by E. R. CURZON, Esq., at the Island of Hoy, during the Summer of 1885, continued from page 272, part lxxii. of the Y.N., by C. S. GREGSON. December 17-19.—*C. brumata* emerged from pupa, small, dark. Only three males and one female were bred. As Mr. Curzon took every larva he could find, it would appear this species so abundant here is scarce at Hoy.—C. S. GREGSON, Liverpool.

ENTOMOLOGICAL SOCIETY OF LONDON.

January 20th. 53rd Anniversary meeting. Robert McLachlan, F.R.S., President, in the chair. An abstract of the Treasurer's accounts was read by Mr. Stainton, one of the Auditors; and the Secretary read the report of the Council. The following gentlemen were then elected as the Council for 1886:—President: Robert McLachlan, F.R.S.; Treasurer: Edward Saunders, F.L.S.; Secretaries: Herbert Goss, F.L.S., and William Ward Fowler, M.A., F.L.S.; Librarian: Ferdinand Grut, F.L.S.; Other Members of Council: T. R. Billups, Edward A. Fitch, F.L.S., F. Du Caul Godman, M.A., F.R.S., W. F. Kirby; E. B. Poulton, M.A., F.G.S.; H. T. Stainton, F.R.S.; Samuel Stevens, F.L.S., and J. Jenner Weir, F.L.S., F.Z.S. The President then delivered an address, and a vote of thanks to him was moved by Mr. Stainton, and seconded by Mr. Pascoe, and the President then replied. A vote of thanks to the officers was then moved by Mr. Dunning, and seconded by Mr. Distant, and Messrs. Saunders, Fitch, Kirby, and Grut replied. This was the first annual meeting since the Incorporation of the Society by Royal Charter.—H. Goss.

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THE COMMON FROG.

(*Rana temporaria*.)

BY W. H. WARNER.

The haunts of this well-known reptile are principally of a watery nature, its favourite resorts being pools, ditches, wells, and stagnant water generally; still it is often found on land, but even then in the dampest places only. It abounds in great numbers over the whole kingdom, even in that reptile-hating country, Ireland. In the latter it is not indigenous, but was introduced "about the beginning of the eighteenth century by Dr. Gwythers, a Physician and Fellow of the University of Dublin, who brought over with him a parcel of frogs from England to Ireland, in order to propagate the species in that kingdom, and threw them into the ditches of the University Park. These all perished, whereupon he sent to England for some bottles of the frog-spawn, which he threw into those ditches, by which means the species of frogs was propagated in Ireland. However, their number was so small in 1720, that a frog was nowhere to be seen except in the neighbourhood of University Park, but within six or seven years after they spread thirty, forty or fifty miles over the country, and so at last by degrees over the whole nation."

About the end of February, or the beginning of March, the naturalist commences his rambles for the season, for at that time the early spring sun begins to exert its influence on the whole animal world. The lovely butterfly, fresh from its winter sleep, is seen poised on the first flower of spring; the bee ventures forth from the snug hive; and the industrious ants troop forth to begin anew their life of activity; the woods are vocal with the joyous songs of the blackbird and thrush; and the nodding snowdrop, the pale primrose, and the "wee modest violet" begin to peep from the hedgerow and coppice. At this time, too, the frog awakes from its hybernal lethargy, and disports itself gaily in our ponds and ditches. A few days later the surfaces of our weedy pools and ditches may be seen partly covered with gelatinous masses of spawn. These jelly-like masses are composed of round, semi-transparent globes or

eggs, each globe or egg having a black spot in the centre, from which the *tadpole* or imperfect frog issues later on. Each female frog is said to produce from 900 to 1,000 eggs. These are first deposited at the bottom of the pool, but in a short time expand and rise to the surface. In about three weeks or a month's time the eggs begin to produce tadpoles, but in warmer climates they are developed much sooner than this. The *ovum* (the black speck in the centre of the globe), is round at first, but gradually becomes elongated and soon assumes the shape of the tadpole, acquires life and motion, and finally by wriggling, the young tadpole frees itself from its slimy surroundings. Thus about the second week in April we find the tadpole of the frog in great plenty in our ponds and ditches. The tadpole presents the appearance of a large head, a long thin tail, but no body or limbs. It is widely distinct from the frog, breathing by means of *branchiæ*, or gills like a fish, while the frog is amphibious and provided with lungs. The frog-tadpole is lighter in colour than that of the toad. Placed under a powerful microscope it forms a very interesting object, the circulation of the blood being very plainly to be seen.

On its emergence from the egg the young "taddy" sets to work and eats the collapsed remains of its former habitat, but as it increases in size it becomes more ambitious. It now devours the green film covering the surface of the water, sucks the juices of any unfortunate rat, dead and floating on the water, and worse than all becomes a cannibal, for if any of its smaller companions become disabled they are quickly swallowed. This cannibalistic propensity exhibits itself principally at an advanced period of its growth. It will also prey on the small tadpole of the newt or eft. It is very gregarious in its habits, playing merrily in shoals like the minnows, and often collecting in large masses at the edge of the pool. In getting through the water the little reptile seems to depend principally upon its tail, which it uses very briskly.

When the tadpole has attained a certain age a most important change takes place in its form, for almost simultaneously a tiny leg gradually bulges out on each side, just above the tail. A short time later the fore feet appear, and the creature then resembles a small eft. Finally it undergoes another change, its tail gradually disappears, and it is then a perfect little frog. Once, however, in my rambles (August 18th, 1879), I met with a little frog travelling along a road, which had not parted with the tail which it had worn as a tadpole, though Master Frog himself was considerably more than an inch long. Some companions of his, travelling the same road, though much smaller, had got rid of their latter ends. Tadpoles may easily be kept by the experimental young naturalist, in wide shallow vessels, with a layer of gravel

at the bottom, and a few waterweeds planted in. A few insects, or bits of raw meat, should be given them when they are a respectable size. A shelving bank of gravel should be contrived, in order that the little frogs may leave the water. Our little frog, being now provided with legs and dismembered of its tail, comes forth from the water in June, and hides in company with dozens of its fellows under stones and in crevices. A sudden shower will bring these little creatures forth from their hiding-places in great numbers, and the passing pedestrian, if he happens to be of a credulous turn of mind, at once concludes that a shower of frogs has fallen. Now I do not mean to affirm that there has not been such a thing as a shower of frogs; on the contrary, I believe it to be possible for the water in ponds and pools to be drawn up in a sort of whirl, and again descend, and with it the fish, reptiles, insects, and what not. Tiny frogs have, undoubtedly, been found on the roofs of houses; and I once found a tiny specimen of the smooth newt (*L. punctatus*) floating on the top of a pan of fresh-fallen rain-water, but how it came there I could never understand, as the pan was more than a foot in height, and newts, so far as I know, cannot climb perpendicularly. Such instances, however, are of rare occurrence.

What owner of a garden is not familiar with the personal appearance of poor froggy, but at the same time how few there are who are conversant with its habits. In our garden rambles we generally find froggy in some damp corner, or under a spreading rhubarb or cabbage leaf, sitting half erect and staring most earnestly at nothing in particular. Give him a slight push, and straightway he springs off a couple of feet. The agility of the frog is indeed remarkable, and it is equally at home in the water, swimming and diving with great address. Being a great lover of moisture, the poor frog in drougthy weather is in great distress, its porous skin becoming hard and horny. But when the genial rain descends, froggy's skin imbibes the moisture freely, and froggy is himself again, changing in a very short time from a meagre, skeleton-like creature, to a wonderfully plump active fellow. So rapid is the frog's power of taking in moisture through the pores of the skin that it has been known to absorb water, equal to itself in bulk, in about an hour and a half.

And what does froggy eat? Why, kind reader, if you happen to be a gardener, you have in poor froggy one of your firmest friends, for he will clear the aphides from your pet plants, and the slugs from your cabbages at a fine rate. He is particularly useful among ferns and greenhouse plants. And with what expertness, too, does froggy seize his prey! Probably but few of my readers have seen the tongue of the frog. It is a most singular and effective piece of mechanism I can assure them. The base of the tongue

is fixed at the entrance of the mouth, the tip pointing down the throat. When wanted for use, this tongue, which is very long, is darted out with great rapidity, and the insect secured on the glutinous tip. When its prey is a worm, the frog advances upon it with open jaws, seizing and worrying it, like a terrier does a rat.

Another very singular thing about the frog, and one, too, I venture to say, quite unknown to those whose knowledge of its habits is confined to an occasional glimpse of one about their garden or orchard. This is simply that he can climb a tree if he feels inclined. Our authority for this statement is the late Rev. C. A. Johns, that most genial and accurate writer on trees, birds, flowers and other "common objects of the country," and his statement which appeared in the *Zoologist*, has been abundantly confirmed by others.

Another singular habit of the frog has been recorded by most natural historians, but whether it is worthy of belief or not I will not venture to say. It is said to have been known to kill fish in a pond by jumping on their backs and thrusting its fore feet into the gills. A frog, too, (according to tradition) once clung to the throat of a water-rat, and soon choked it, a very remarkable feat truly. For my own part I should scarcely think so sharp-toothed and active an animal as the water-rat would be easily disposed of by a poor frog, and I am consequently inclined to doubt the whole.

Like most other reptiles, froggy occasionally changes his skin, generally losing it piece by piece in the water, but sometimes he will gulp down his cast-off garment by way of a snack.

The frog is about the only reptile in this country which does not labour under the disadvantage of having an ill name. No one, I believe, has ever charged the poor creature with being poisonous or hurtful in any way. Indeed some curious folks in Oxfordshire (and other counties for all I know to the contrary), have been known to swallow small frogs as a remedy for consumption; and one placed alive in the mouth of a child suffering from thrush, is said in Cheshire, to be a certain cure for that complaint. The frog, however, though harmless, has many enemies. That crafty glider among the ferns—the fox, the slow badger, and the active weasel and stoat, do not disdain such ignoble fare, neither does the hedgehog. The magpie, the jay, the carrion crow, and many of the hawks also devour the poor creature, so also do the viper and the snake. Then it has enemies in the water too. That stately and beautiful riverside frequenter—the heron—often preys on the frog; and all readers of story books know what was the fate of the "frog who would a wooing go." The gluttonous pike or jack is also a great enemy of the frog. A fisherman once told me that he had caught a jack in a ditch, which, immediately after its capture, flung up three great yellow frogs, one of which

was partly digested. But its most terrible enemy in the water is the brown rat, numbers of which creatures leave our ricks and barns in spring, and take up their residence on the banks of ponds of streams, migrating back again when the crops are housed and winter approaches. Even on land the rat will attack the frog. I have a note in my diary of a rat having been seen crossing a road with a frog in its mouth. There was no mistake about it, as Master Rat was stopped and killed.

The means by which froggy expresses his joys and fears is through the medium of croaking and squeaking. The former is principally heard in the spring of the year about damp meadows, ditches, and ponds. Froggy is now engaged in courting, and in the joy of his heart lays his lower jaw on the water, puffs out his cheeks, and produces that delightful sound known as croaking. In some marshy districts, especially in continental countries, the croaking of frogs at night is almost unbearable. But when froggy's fears are excited, he utters a very different sound. This is a thin, shrill squeak, long or short according as to whether his alarm is great or small.

The frog possesses great tenacity of life. Divested of its skin, and even of its head, it still exhibits great muscular activity, and there is a well-accredited story of a frog, which had been frozen in a cistern, at Clifton, near Bristol, in 1845, which though frozen to such an extent that one of its legs was broken off, yet on the thaw occurring, revived and swam about as actively as a frog with three legs could be expected to do.

Towards the end of October or the beginning of November froggy disappears from public view, and is seen no more till the early spring months of the following year. What does he do with himself? Why, dear reader, he simply buries himself. You may find him at these times, in company with multitudes of his fellows in the mud at the bottom of ponds and pools. This is froggy's usual mode of hybernating. In one of his interesting works, however, the Rev. J. Wood mentions another way. He says, "In February, 1852, two frogs were dug out of the gravelled play-ground of Magdalen School, Oxford. They were about a foot from the surface of the ground, and their habitation was quite smooth. Both were sitting with their mouths pointed upward, but I could not ascertain if there had been any communication with the open air." In warm places, such as cellars, the frog does not seem to hybernate; I have found it in company with newts in such places as late as the end of December. I have also seen the frog in the open air so late as November 22nd, and on one occasion as early as the 26th of January. In the latter case, froggy was stretched stiff and frozen on the grass of an orchard, having evidently been tempted forth by a few genial days which had occurred beforehand.

When froggy wakes up from his nap the following spring he soon makes his way to the nearest marsh or pond. In an old work, entitled "An Essay towards a Natural History of Westmoreland and Cumberland," by a certain Rev. Thomas Robinson, occurs the following curious note. He says, "Riding over the mountains one warm spring morning, I saw infinite numbers of frogs coming out of their winter quarters, which was a vast heap of loose stones. The females were so overburdened with their spawn that the male frogs bore them on their backs; and in this posture they crossed my way in such numbers that my horse trod several of them to death. Their march was into the next marsh."

The length of the adult frog is about three inches. The colour above varies from pale yellowish brown to dark brown, spotted irregularly with with dark brown or black; legs barred or banded with the same. There is a patch of dark brown behind the eyes, and a pale line down each side of the back. It is very liable to variations of colour. Sometimes the under parts will be of a bright chrome-yellow, instead of the usual pale yellow colour, with the spots and bands almost black. Another frog which I once met with in the autumn time was large and most beautifully coloured, being of a rich reddish-orange tint, shaded and varied in a very exquisite fashion with darker colours. The dark patch behind the eye easily distinguishes *R. temporaria* from the rarer species *R. esculenta*.

Standlake, Witney, Oxon.

CAPTURING AND PRESERVING SPIDERS.

BY THE REV. O. PICKARD-CAMBRIDGE, M.A., C.M.Z.S., &c.

[Several correspondents having asked for instructions on this subject, the Rev. O. Pickard-Cambridge has kindly given permission for the Reprinting of the following paper which first appeared in the Transaction of the "Dorset Natural History and Antiquarian Field Club."]

"The study of spiders is peculiarly suited to persons of a sedentary habit, or to those who may love natural history pursuits, but do not desire to form a collection. In this respect the observing of spiders possesses an advantage over the observation of the insect tribes in general, inasmuch as spiders are more stationary, and when found in their hold, corner, or web, do not escape observation by flight, but require only patience in the observer to unfold much of their history and economy. The collector often debars himself from the discovery of many a fact in the habits and life of the object of his search

by anxiety to add to his collection, and fear lest the specimen should escape. Still there are many points that can only be ascertained by a close study and examination of the object itself; and, especially in regard to spiders, the scrutiny of those often minute, but important, structural and other characters upon which the determination of their species and systematic position depend is imperative, and hence it is absolutely necessary both to capture and preserve specimens.

Probably the difficulty of making pretty cabinet objects of spiders has, in some measure, hindered their being studied and collected as commonly as the insect orders. But, premising here that this difficulty can be, in a great degree, overcome, it will be well to say a word first about their *capture* (on the well-known principle of "First catch your hare.")

First, then, it ought to be an axiom with the spider-collector never to handle a spider with the fingers if it can possibly be avoided; because they can scarcely be handled without great danger of breaking off the legs, or destroying the hairs, bristles, and spines with which most of them are more or less furnished. To break off these is to deprive oneself of one of the best characters for the determination of the spider; not to mention that the colours and markings often depend on the hairs and hairy pubescence with which the cephalo-thorax and abdomen are frequently clothed, and which always show sad traces of destruction after contact with the fingers. The only spiders that may be caught without much danger of injury in this way are the very minute ones (especially of the genera *Neriëne* and *Walckenaëra*) upon which the wetted fore-finger may be lightly placed; the moisture causes them to adhere to the finger enough for immersion in the small phial of spirits of wine carried in the waistcoat pocket. Spiders may be boxed (separately of course) in small pill-boxes; a drop of chloroform stupefies them, and they can then be examined, and rejected if not wanted, or at once placed in the spirit phial, if required for the collection; but the most convenient method of capturing a spider is to place over it an empty test-tube (one of $\frac{1}{2}$ to $\frac{5}{8}$ of an inch in diameter and 3 in. long is a good general size for most British species); the spider instantly runs up the tube, or may be made to do so, the fore-finger then closes over the mouth temporarily, and on the inversion of the tube over the open mouth of the spirit phial, the spider drops down at once, and the matter is ended. Ordinary methylated spirit is the best fluid for both killing and preserving spiders; but for the latter purpose (as the spirit is usually about fifty or sixty degrees above proof) it should be diluted with about one-fifth or one-sixth part of distilled water, otherwise it is apt, after a time, to corrugate the integument of small and delicate spiders.

Those spiders which are found running or jumping about on the ground, or on walls or trunks of trees, can easily be caught thus, by means of a test-tube, with very little practice; for others, which frequent low herbage, a "sweeping-net" (such as those used by entomologists) must be employed; and for those who live on bushes or boughs of trees, there is nothing better than a very large umbrella, into which the boughs may be beaten; and whether in the net or umbrella, the pill-box or tube will have to be employed for the transfer of the spiders to the spirit bottle. When the day's collecting is done the contents of the bottle must be sorted into tubes of different sizes, according to their genera and species. This can most conveniently be done by turning out the whole contents of the bottle into the cover of a potted-meat pot, or into a saucer. The spiders should then be separated and placed in the tubes by means of a pair of very fine-pointed and elastic forceps, each spider being taken up by a single leg; the tube is then filled up with clean spirit, a pledget of cotton-wool is placed firmly in its mouth with the forceps, together with a small parchment label, on which (if the label is large enough) the name of the spider is written; or else a number is inserted in figures, referring to a note-book, wherein notes of locality or habits, &c., are written. The tube thus filled and stopped is then placed, in an inverted position, in a larger, wide-mouthed bottle, capable of holding several species, or perhaps a whole genus; this wide-mouthed bottle is partly filled with spirit, corked, or stopped with a glass stopper, and has a large label outside, on which the name of the genus and species, or perhaps merely the number of the tube may be placed, so as to show its contents and facilitate reference. A larger pair of forceps, with broad flattened points, is necessary for placing the tubes in the bottle, and for taking them out when the spiders are required for examination.*

Spiders preserved after the above method are certainly not objects of beauty like a collection of moths and butterflies; for, though the colours and markings are usually well enough preserved, the legs are often crumpled up a good deal. To the "Goodness gracious" sort of naturalists they are by no means acceptable. The only remark my collection elicited from one of this kind was, "What a lot of bottles!" A little extra trouble, however, in the preparation of a spider will render it worth noticing even by indifferent persons. When stupefied with chloroform, or killed by a short immersion in spirit, the spider should be placed on a piece of cork, fixed to a thin layer of lead; a few pins at various points (not through the spider, but between the legs and outside the body) will keep it in a natural position; the whole is then placed

* Experience has proved that a good black-lead pencil is better for writing on labels, for insertion in spirit, than ink.—O.P.-C.

in a clean empty jar or basin (a preserved-meat pot is one of the best receptacles I know of), sufficient spirit is poured in to immerse the spider, and the cover is put on. In a fortnight or so the action of the spirit will, if it be pretty strong, have stiffened the specimen, which must then be placed carefully in a tube sufficiently large to receive it without too much compression of the legs; a small strip of white card should be slipped in behind it, the tube filled up with spirit, and corked (or, better still, stopped with a pledget of cotton-wool), and inverted in a larger bottle, as recommended above. The spider's name may also be written on paper or parchment, and inserted in the tube. Prepared in this way, and ranged on narrow shelves, the spiders may be seen without removing the tubes from the bottles, and they present a very neat and sightly appearance even to the most indifferent observer.

The places in which spiders are found are very various, and no situation wet or dry, high or low, should be left unsearched. In the winter and spring months, moss and *débris* of all kinds, such as heaps of grass, cut rushes, fern, dead leaves, brushwood, and decaying faggots, should be carefully searched, the collector shaking out those various materials over a newspaper, when many a rare species of *Neriène* or *Walchenaëra*, as well as some kinds of *Drassidæ* and others, seldom met with elsewhere, will be found. As spring advances and summer comes on, spiders, as a rule, leave their winter haunts, and get up upon the bushes and trees, and amongst rushes, grass, and other herbage of all kinds, when the sweep-net and umbrella, as above recommended, will come into requisition. At all times in the year spiders conceal themselves under stones, logs of wood, old bark, ivy-stems, and other such shelter; while many species, especially the adult males, may be found running upon the surface of the ground, disporting themselves on walls, tree-trunks, posts and rails, or running on the uppermost bar of iron fencing. Old buildings, cellars, and unused rooms are also the habitats of some peculiar species. In fact, wherever insect life can penetrate, spiders of one kind or another are sure to be found; and, as in all other Natural History pursuits, the keenest eye, the most dextrous fingers, and the most unwearied toil and patience, will bring the greatest number of rarities to the Araneologist."

CONCHOLOGICAL JOTTINGS.

By ALBERT H. WATERS, B.A., M.C.S., &c.

(Continued from Page 26.)

So far I have been writing about marine *mollusca*. I now proceed to jot down a few notes on land and freshwater shells. Without attempting to

give anything like a complete list of the species occurring in the country, I shall mainly confine myself to the mention of such kinds as I have personally met with in Cambridgeshire. A full account of the molluscan fauna of that county—particularly of the fenland portion—would be highly interesting. I am not aware that any such exists, but I myself contemplate shortly publishing a catalogue of all the species I know of as occurring in both the fens and the higher parts of the county. If any conchological readers of the *Young Naturalist* can assist me I shall be very glad to hear from them, and will thankfully acknowledge their communications. Non-conchologists too will greatly help me if they kindly forward parcels of shells or slugs found by them in the county. I will gladly repay the expense of postage and, if possible, make some suitable return.

The search for land and freshwater shells, although to my mind inferior in interest to the collection of marine kinds, yet has its charms. There is one great advantage in being a student of terrestrial mollusca, and that is it affords out-door occupation when most other natural history work is at a standstill. A soaking wet day for instance will condemn an entomologist to enforced idleness, but on such a day the conchologist rejoices, for he knows that the rain will bring *Helix nemoralis* and others of its kindred out in hundreds, and there is nothing like a wet day for collecting specimens of the varieties of the wood snail. I was out entomologising one day last September in the Cambridgeshire fens; it was a very bright morning when I started. Cabbage and green-veined white butterflies, small tortoiseshells, blues, small heaths and meadow browns were disporting themselves in numbers in the warm sunshine, but when it got past noon one of these thunder-storms so frequent in the fenland came on, and the drenching rain soon suspended all entomological operations, but the fluvial down-pour soon engaged me in other work, for it brought *Helix nemoralis* out in such numbers that I was very soon busily engaged picking up specimens of this pretty snail, and collecting varieties regardless of both the rain and the lightning. In considerably less than half-an-hour I had filled three large larvæ tins, notwithstanding that I discarded most individuals of the commoner forms. The pink kind (*Rubella*) were the most abundant, and of these I obtained quite a dozen modifications of the bands. Specimens with the bands entirely wanting were by far the most numerous, and next to them in abundance were those with all five present. Individuals (000 :: and :: 3 ::) with the bands nearly obliterated were plentiful, and I obtained several with all the zones united as well as others with the second and third and the fourth and fifth—0 (2 3) (4 5)—coalescing; the first being absent. I also obtained some with the first three, and the last two nearly coalescing. The other varieties I found

had the band formulæ (1 2 3) 4 5, a few, 1 (2 3) 4 5, not numerous, 1 : 3 (4 5), a few 0 2 3 4 5, 0 : 3 4 5 and 1 2 3 (4 5), which last had all the bands united at the mouth.

None of the yellow variety (*libellula*) were so plentiful, as those with pink-coloured shells. Some were bandless, and others had all five zones present; some had the first two and the fourth and fifth bands coalescing, while the third one was distinct, and in others the first two and the fourth and fifth nearly coalesced, but were not quite united. Some had all the bands united at the mouth, but round the periphery of the shell the first two were distinct, and the third and fourth coalescing into one broad zone; others—0 2 3 (4 5)—had the first band wanting, but the second and third distinct and the fourth and fifth united; and others—0 (2 3 4 5) had the first band wanting, and all the others coalescing, whilst some—: : : :—had every band interrupted, and nearly obliterated. The remainder had the band formulæ 0 0 3 4 5, 0 : 3 (4 5), : 2 3 4 5, 1 2 3 (4 5) and 1 2 (3 4 5). The last had all the zones united at the mouth.

Of the brown variety (*castanea*) all the specimens I found had the bands entirely absent, excepting one which showed traces of a whitish band in the position of that distinguished as No. 4.

It is noteworthy that I found all these forms in a space of ground less than a rood in extent, and all were living in the same conditions and feeding on the same food, (*Salix viminalis*), so that neither the nature of the soil nor the character of their diet could have had any influence in producing these varietal differences.

Besides *Helix memoralis* I found numbers of *Helix hortensis*, but every one was of the yellow form (*lutea*), and with no bands; not but what this variety often occurs with all five zones plainly marked. Pink specimens too are found in some cases entire devoid of markings, and in others with the five bands present. The name "*incarnata*" has been given to varieties of this colour.

I have found the olive brown form, "*olivacea*" in Cambridgeshire; the band markings are entirely absent. There are other varieties to which names have been given, which I have not so far met with; for example, those of a brown or lilac colour ("*Simonia*" and "*Lilacina*"), the albino form and the very pretty pink lipped "*roseo-labiata*."

I have gossiped so much about *Helix memoralis* and *Helix hortensis* that I fear I must leave the consideration of other species for a future paper, as I do not desire to take up too much space. Before I close, however, I should like to mention one or two facts in the history of the wood snail, which have come under my observation. In the first place I notice *Helix*

memoralis exhibits rather a liking for damp clayey soils, although perhaps not so markedly as does *H. hortensis*. Secondly, it is not exclusively vegetarian in its diet, for specimens I have in confinement will eat meat. Like other snails it buries itself in the earth for some days when desirous of increasing the size of its shell. I seems susceptible of cold, for in winter time it covers its mouth with a double layer of hardened mucous.

Mill Road, Cambridge.

(To be continued.)

BOOKS RECEIVED.

“The Larvæ of the British Butterflies and Moths. By (the late) W. BUCKLER, edited by H. T. STAINTON, F.R.S. Vol. I.—The Butterflies.”

BEING THE RAY SOCIETY VOLUME FOR 1885.

For more than a quarter of a century before his death, Mr. Buckler had been figuring and describing the larvæ of the British Lepidoptera. A miniature painter by profession, and an Entomologist by taste, there was here a happy combination of circumstances, tending to the desired end. When it became generally known that Mr. Buckler was “painting the portraits” of larvæ of British Lepidoptera, entomologists generally lent their aid, and as the number unfigured became reduced, the more experienced collectors made special efforts to obtain for him those, that from their rarity or retiring habits were seldom seen. Many unknown larvæ were thus discovered, and still more numerous were those whose descriptions were previously to be found only in the writings of foreign entomologists, which Mr. Buckler was the first English observer to rear. Nor was he content with what would have satisfied many. Unless he succeeded in rearing the perfect insect he did not consider he had done enough, and would try again and again until that was accomplished. As he obtained greater experience in observing, his descriptions became longer, but unlike others who have published lengthy descriptions of larvæ, Mr. Buckler seemed to excel in word-painting, and never lost the sense in a multitude of words. Along with him, the Rev. John Hellins, of Exeter, laboured, the two working “together more than is ordinarily the case,” nothing being published by either without the critical scrutiny of the other. With the descriptive work of these gentlemen, readers of the *Entomologists Monthly Magazine* have long been familiar, and when Mr. Buckler’s unexpected decease was announced, there was some fear lest his valued labours in depicting the larvæ might be lost to the entomological world. Fortunately, at this juncture, the Ray Society stepped in, purchased

the drawings and note books, and we now have the first instalment of the work. It would be manifestly unfair, to criticise in the ordinary way, a book that is issued without the personal supervision of the author. A work indeed that is but a number of fragments, collected with a view to future publication, not a completed work at all. The letterpress is made up as follows: First there is given the descriptions of larvæ and their habits, as already published from time to time by Messrs. Buckler and Hellins, in the *E.M.M.*, almost since its commencement. Second, we are given a large number of extracts, hitherto unpublished, from Mr. Buckler's note books, of which we are informed he left four volumes. Third, we are presented with an appendix by the Rev. John Hellins, describing several larvæ, of which Mr. Buckler had left no description. This was rendered necessary, as we are informed in the preface, because "of many comparatively common species, which had long ago been carefully figured both in the larva and pupa state, by William Buckler, no descriptive notes had been published by him, nor were any found amongst his papers. It was necessary, therefore, to try and supply to some extent these omissions." The book thus made up contains figures of the larvæ of no less than fifty-eight out of our sixty-three species of butterflies, and descriptions more or less complete of fifty-seven. Of many species several figures are given; in some cases as many as six or eight, or even more; of *Apatura Iris*, there are eleven, representing different stages of growth, or different forms of the larva. If any of our readers will reckon up how many of the butterflies they have reared, they will agree that in this group Mr. Buckler has done a great work, and they will find, as subsequent volumes appear, that as large, or perhaps a larger proportion of other groups have been figured. It may be of interest to our readers to mention those species, of which a full life history is not given in the volume before us. They are—

Colias Hyale. Egg and young larva described. No figure.

Aporia Cratagi. No description. Figures given of young gregarious larvæ after first moult, of larva after third and fourth moult, and of the pupa, six figures in all.

Erebia Cassiope. Young larva described and figured. Pupa described.

Argynnis Lathonia. Neither figure nor description.

Melitæ Cinxia. No description; two figures.

Thecla Pruni. No description; four figures.

„ *W-Album*. No description; five figures.

Polyommatus Acis. Neither figure nor description.

„ *Arion*. Egg described; no figure.

Pamphila Comma. Egg described; no figure.

Of only two species, therefore, *A. Lathonia* and *P. Acis*, has Mr Buckler done nothing towards their life history, and when we say that by far the largest proportion of the species have been reared from the egg, the work done will be better appreciated. It remains but to speak of the figures themselves. Those who have seen any of Mr. Buckler's coloured drawings know with what extreme beauty of finish and correctness of detail they were done. The figures in the present volume fully realise our expectations, and in number considerably exceed what we looked for. The preface says "those who know anything of such work, will appreciate the difficulty sometimes felt by our engraver, in reproducing colour drawings, without the help of the instructions of the artist who made them." We can only say that, in our opinion, we consider Mr. Moore has succeeded admirably.

Those of our readers who are interested in nomenclature, will be glad to know that the German names are not adopted in this volume.

We will take future opportunity of calling attention to many interesting portions of the volume, and next month will give our readers a descriptive account of Mr. Buckler's collection of Lepidoptera, chiefly bred from the larvæ figured. This collection is for sale, and ought to be the property of some public body.

NOTES ON THE SEASON OF 1885.

By G. A. LEWCOCK.*

A correspondent, recently writing to me respecting some works on Coleoptera, said, "I have made a large collection during a thirteen years residence in India; the insects at present are only grouped in families, whether I shall ever be able to reduce them to genera I don't know, but species seems hopeless." It was in this dilemma that application was made to me, and in reply I imparted such information as was in my power.

Now it has occurred to me since this correspondence, that there are many persons similarly situated, and that it would be of advantage to many of us, and especially to those who from want of time and opportunity are unable to obtain insects of the orders of Entomology in which they are interested, if we could devote a little time to the relation of our entomological experiences of the past season. Speaking of my own experience, in former years, when first I took up with Coleoptera, I found it rather difficult to proceed, as the directions generally given for procuring the different species of beetles were rather indefinite, and left you somewhat to your own devices as to the mode

*Read at the meeting of the Haggerston Entomological Society Feb. 11th, 1886.

of obtaining them. However, on entering into correspondence with the Rev. W. W. Fowler, he kindly assisted me; and sometime afterwards a series of articles from his pen appeared in the pages of the *Entomologists Monthly Magazine*, which, from the amount of information given therein are well worth the perusal of anyone who desires to take up the study of Coleoptera. Another series of excellent articles, by Dr. Ellis, of Liverpool, are also appearing in current numbers of the *Young Naturalist*.

In taking notes of captures, I have found it very useful to make a record of the date of capture, the locality, and the mode of obtaining particular species, and I am pleased to observe that Mr. Robert Gillo, of Bath, and Mr. Wilding, of Liverpool, in their interesting articles on Coleoptera in the pages of the *Young Naturalist*, follow the same practice.

I will now proceed to enumerate the Coleoptera I have captured during the past year.

The season of 1885 commenced rather unpleasantly—wind and rain greatly impeded operations, and for some little time collecting was rather an unprofitable occupation. My first venture was to Rainham, Essex, on April 6, in company with Mr. Cripps. Beyond noting the characteristics of the country and making a general survey we did very little. *Phædon tumidulum* was excessively common on cow parsley and other herbage by the river banks. *Hypera nigrirostris* was also moderately common; likewise *Anthicus antherinus*, *Dromius meridionalis*, *Micraspis 12-punctata* and *Coccinella 11-punctata*; I also captured a female of *Ptilinus pectinicornis*, and a few other things. Rainham seemed a very likely place for coleoptera; the country generally is cut up and intersected by numerous small ditches and dykes, with a fair quantity of common reeds, rushes, and water plants growing therein. But on this occasion our career was stopped soon after 12 by rain.

May 9. I went to Surbiton by 1.35 train. I obtained by sweeping *Rhynchites Germanicus*, several specimens of *Thyamis*; *Ceuthorrhynchidius troglodytes* and *Prasocuris aucta* commonly; *Phyllotreta undulata*, *P. nemorum*, and one specimen of *Ceuthorrhynchus campestris*; but, as formerly, rain set in early and again stopped our operations.

May 23 to 25. Cold rain prevailed during the morning of 23rd, but fine weather in the afternoon. I left Waterloo for Woking at 1.35. I proceeded from Woking station by the canal and through a small patch of wood to Brookwood. The herbage being wet and wind high, beating was a difficult job. However, I got *Phyllobius maculicornis*, *P. pomonæ* and *P. pyri* from oak, and *Sitones regensteinensis* very commonly from broom and furze, and a few other beetles. From Brookwood I took train to Farnham in the evening. On 24th and 25th I tried beating the broom, *Phyllobii* were rather

common, also *Sitones*, and I got 1 *Balaninus glandium*, and 3 *Asclera cærulea*; of the latter species, I found a small colony on poplar at this locality in 1880. Rain set in at 10 a.m. on 25th, and again spoiled my sport.

June 6. The selected localities were Surbiton, Oxshot, and Esher. In spite of the bad weather, insects seemed to be abundant; I tried beating the hawthorn blossom, and got several *Grammoptera tabacicolor* and *G. ruficornis*, and also swept from the wet herbage *Rhinosimus ruficollis*, *Chrysomela polita* and *C. staphylæa*, *Telephorus hæmorrhoidalis*, &c. Also found the first *Donaciæ* of the season, viz., *D. menyanthidis*, and *D. sericea*.

June 13. We took train by the new line to Oxshot, and had a splendid day's sport; the weather, for once, being everything that one could desire. On this occasion we met a party of the South London Entomological Society out on a field day excursion. The first capture on this day was *Byrrhus fasciatus*, followed by 2 *Harpalus honestus (ignavus)*, 2 *Cleonus nebulosus* (very fine specimens indeed and in good condition), *Pterostichus lepidus*, 4 *Timarcha coriaria*, *Ochina hederæ*, (the latter on wild sage), *Coccinella 22-punctata*, *Tychius picirostris*, *T. tomentosus*, 5 *Anisotoma calcarata*, *Autalia impressa*, *Bryaxis fossulata*, *B. sanguinea*, *Mantura rustica*, *Ceuthorrhynchus asperifoliarium*, *Apthona cyanella*, *Choleva Watsoni*, *Luperus betulinus* in hundreds, *Grammoptera tabacicolor*; 4 *Anthocomus fasciatus*, *Telephorus pallidus*, (common), *Phyllopertha horticola*, *Melanotus rufipes*, and several other things. All these insects were obtained by general sweeping, and by searching, and in the sandpits. At the water a great success attended our efforts. Having thrown off a portion of our clothing, Mr. Cripps and myself waded in up to our thighs and commenced searching for *Donaciæ*. It is by far the best plan to seek this genus in the water, as, if you find the right spot, *Donaciæ* are generally abundant. Our captures here amounted to about 400 specimens, and included 100 *D. thalassina*, 70 *D. typhæ* (from *Typha latifolia*), 20 *D. sericea*, and the remainder *D. menyanthidis*. Altogether an excellent finish to our day's sport.

June 20. Had one hour's sweeping and searching at Rainham, when both Mr. Cripps and myself were soon drenched in our nether garments, and were reluctantly compelled to desist. Our captures this day included *Telephorus lateralis*, *T. flavilabris*, *Anthicus antherinus*, *Clivina collaris*, *Malachius viridis*, *Bembidium lunatum*, and several *Anchomeni*, mostly *A. Viduus*.

July 4. Esher. Weather fine and again hot. I obtained *Donacia thalassina*, *D. typhæ*, and *D. menyanthidis*, the latter very much discoloured and were the last of the species seen during the year. I also got *Anchomenus gracilis*, *Elaphrus cupreus*, *Lacon murinus*, *Athous longicollis*, and

one *Stenolophus Teutonius*; I likewise found a larva of *Jina populi* on sallow, and bred the perfect insect a fortnight later.

July 11 to 13. I started on the 11th from Waterloo for Surbiton, and went for a long ramble through Hook, Cleygate, Oxshot, Claremont, Kingston, and thence to Teddington. Weather hot. I commenced sweeping by the hedges and in meadows. I tried hard for *Malachius ruficollis* and *M. pulicarius*, but I got only *M. ruficollis*, and that sparingly. I took several *Gymnetron pascuorum*, *Cholevina* from fungi, 2 *Anthocomus fasciatus*, *Tychius tomentosus*, *Cleonus nebulosus*, (the third of the season) *Athous longicollis* *Hypera variabilis*, *H. plantaginis*, *Anobium fulvicorne*, *Anchomenus gracilis*, *Balinius brassicæ*, *B. pyrrhoceras*; I also got 4 *Donacia thalassina*, 8 *D. Typhæ*, 2 *Cæliodes subrufus* (from oak), and *Tanymechus palliatus* from thistle. A heavy downpour of rain took place soon after my arrival at Teddington, consequently I did not attempt much collecting the next day, but by searching I found about 30 *Telmatophilus typhæ* on *Typha latifolia*, also larvæ and pupæ of the moth *Nonagria typhæ* in the stems of the same plant. Picked up one or two *Lucanus cervus*, and I saw several *P. bucephala* at rest on the lamps in the streets at Teddington; I took home one or two of these out of curiosity, as I thought it rather late for this species. On the 12th I started early to meet Mr. Cripps at Strawberry Hill, and we proceeded by way of Hampton and Fulwell to Sunbury and Shepperton. I swept from Umbelliferæ several *Leptura livida*, *Athous longicollis* (male and female), and one male of *Malachius æneus*. Eventually we found our way to a small stream, and got into the water to search for *Donaciæ*. Here we soon found several *D. sericea*, and 1 *D. lemnae*. Owing to my eagerness in getting after this last insect I was severely bitten in the legs and feet by a small insect in the duckweed, which caused me much irritation. We proceeded with our sweeping, and I subsequently obtained 5 very pretty specimens of *Gymnetron becabungæ*, 4 *Baris T-album*, several *Phedon cockleariæ* and *Chrysomela polita*. The captures of *Donaciæ* in Surrey are very interesting, and my experience in the genus is as follows:—

Donacia bidens, obtained at Esher (from pond now drained) in September.

do. *dentata*, ditto ditto, also from Chobham, in August.

do. *sparganii*, Esther, one specimen from *sparganium*, in August.

do. *sagittariæ*, The Wey, Moorpark, Farnham, early in July.

do. *lemnae*, Farnham and Sunbury; also taken by Mr. Cripps at Ramsgate, Kent, in July.

do. *thalassina*, Esher and Farnham, common on rushes, May to July.

do. *linearis*, Esher, Farnham, Sunbury, &c.; common on various plants in running water. June to August.

- do. *typha*. Esher and Farnham, on *Typha latifolia*. June, July.
 do. *simplex*, (*semicuprea*). Farnham (May), and Sunbury (July)
 do. *menyanthidis*. Esther. Very local on a species of reed. June, July.
 do. *sericea*. Esher and Sunbury. On rushes. Very common at times,
 but not so this year. May, July.
 do. *comari*. Esher. Rather difficult to distinguish from *D sericea*.
 Only 4 specimens. July.

do. *dentipes*, taken at Aylsham, Norfolk.

Of the remaining members of this genus, I have been kindly supplied by the Rev. W. W. Fowler with types of three other species, and a series of *D. nigra* from Mr. Bedford Pim and Mr. Theodore Wood.

July 25. Surbiton to Oxshot, &c. Weather scorching hot. I tried hard for *Malachius pulicarius* again, but I got only one male. This species is not common; but in 1884 I obtained seven, and though I went four times last season expressly for it, I failed on all but this occasion. I swept a couple of *Cryptohypnus 4 pustulatus* from same locality as previous year, viz. a meadow, but sweeping was generally unproductive. I also took several *Apion rufirostre*, *Elaphrus cupreus*, *Harpalus honestus*, *Calathus flavipes*, *Hypera polygoni*, *Athous longicollis*, and a dozen *Gastrophysa polygoni*.

August 3. I visited Shiere, being hospitably received by Dr. Capron. Had the pleasure of looking over his collections of *Coleoptera*, *Hemiptera*, *Hymenoptera*, &c., noting particularly the care and attention the doctor bestows on setting his insects, all being cleanly mounted on white ivory card, and were in the pink of perfection. I strolled out with him for a short time in the afternoon, and swept two *Cryptocephalus minutus*, 1 *Ceuthorrhynchus asperifoliarium*, a female *Athous longicollis*, 2 *Edemera lurida*, and a few other common things; the Doctor also gave me two *Necrophorus ruspator*, and some *Gymnetron*, which were very acceptable. Taking it altogether I was exceedingly gratified with the result of my trip to Shiere.

August 8. I had another try at Rainham. Found *Coccinella 7-punctata* and *C. 11-punctata*, in swarms, likewise a few *C. 14-punctata*, and a great quantity of *Gastrophysa polygoni*; the female of the latter, puffed out like a ball, presented a curious appearance. I also took *Ceuthorrhynchus quadridens*; and by shaking bundles of reeds into an umbrella, I obtained several *Anthicus antherinus* and *A. floralis*, two *Erirrhinus festucae*, *Hypera variabilis*, *A. nigrirostris*, *Leistus rufescens*, several *Anchomeni*, including *A. viduus*, *A. Albipes*, *A. prasinus*, *A. parumpunctatus*, and *A. marginatus*. Among the rubbish I found *Bembidium 4-guttatum*, *B. varium*, *Trechus minutus*, *Chlenius vestitus*, *Demetrias monostigna*, *Harpalus sabulicola*, *Amara convexiuscula*, &c.

At odd times during the year, among other things which I have picked up, and those which have been brought to me by friends, and members of the Haggerston E. S., may be noticed *Anisodactylus binotatus*, from Wormwood Scrubs, *Toxotus meridianus Saperda carcharias* (three nice specimens from Southend), *Aphodius subterraneus*, *Onthophagus vacca*, *Pyrochroa serraticornis* (two taken by Mr. F. Anderson at Croydon), *Podagrica fuscicornis*, (from Brighton), *Phratora vulgatissima* (Putney), and *Gibbium scotius* (which I was fortunate enough to find in our city office.)

As Esher is the principal neighbourhood worked by Mr. Cripps and myself, it may be as well in conclusion to state that we find this a somewhat variable locality, the different parts have to be worked at different times of the year, but taken altogether, we are quite satisfied with the insects we obtain there. When in former years I used to collect Lepidoptera in this district with my brother, I obtained several good things in this branch of Entomology, but I rather think a deterioration has taken place in the pine plantation, as several fires have occurred in some of the best portions of the wood; but those who do not mind hard work will still find some things here to repay them for their trouble of working when they know the locality.

40, Oxford Street, Islington, N:

ADDERS AND CATERPILLARS.

By JOHN MACKAY.

It is well known that most Highland people, as a general rule, have a great dread of anything in the shape of an adder. So much is this the case that large caterpillars, having scarcely any resemblance to the adder in appearance, are looked upon with distrust, the people believing them to be young adders. As an illustration of this, I give the following amusing little story, which serves to show the firm belief which the Highland people have, that the adder's bite is deadly poison.

The summer before last I happened to visit that famous insect locality, the Island of Arran, for the purpose of collecting specimens of *Plusia interrogationis*, the Arran variety of *C. russata*, and other rare species, and while rambling over the hills I filled a large larvæ tin with the larvæ of *Bombyx quercus*, which were rather common, feeding on the heather.

On my return to Glasgow in the evening I called at the house of a friend. Having occasion to open the larvæ-box, some of the caterpillars accidentally fell on the floor. I was soon startled by hearing a scream, and the good lady of the house retreated to the other end of the apartment rather hastily. From this secure position she abused me heartily for taking into her house

what she termed a nest of "bull-ethers," or adders, remarking that it was a wonder I had not been "stung to death." I was not a little amused when I discovered the cause of her alarm, and solemnly assured her that the "poor innocent creatures could no more sting anyone than I could "fly to the moon." This assurance she treated with supreme indifference, and it was only when I had placed the last caterpillar safely into the box that she could be induced to part with the chair, behind which she had retreated for safety.

I then endeavoured to explain to her that as caterpillars had no fangs it was impossible for them to sting anyone. That the creatures which I had in the box could climb by means of claspers, and these no adders possess. And that they had hairy bodies, and the adder's body is smooth and scaly. No argument of mine, however, could induce her to believe that the creatures were quite harmless. She maintained that the "beastes" were dangerous and could sting; and this opinion she based on the fact that her father had told her, when a young girl at home in the Highlands, that the "bull-ethers" were poisonous, and should be avoided. And, she concluded, her father knew much more of these things than the young men of the rising generation. For, in the Highlands, where the "bull-ethers" were most numerous, adders at that place were more plentiful than elsewhere.

I saw that to reason further was hopeless. Like most people she had certain fixed notions, which no one would persuade her to believe were wrong. In my visits to the Highlands, and in conversation with Highland people in the town, I have found that they fully believe that to be bitten by an adder is almost certain death; but, it is strange, that no one yet has ever been able to give me a single instance in which anyone they knew personally died from an adder's bite.

78, Gloucester Street, Glasgow.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 3. ROBERT M'LACHLAN, Esq., F.R.S., President, in the chair.

The President nominated Mr. F. Du Cane Godman, F.R.S., Mr. H. T. Stainton, F.R.S., and Mr. J. Jenner Weir, F.L.S., Vice-Presidents for the ensuing year.

Dr. Livett, Lieutenant Goodrich, Eustace Bankes, Esq., and F. Enock, Esq., were elected Fellows; and M. Ragonot, of Paris, ex-President of the Entomological Society of France, was elected a Foreign Member of the Society.

Mr. C. O. Waterhouse exhibited some cottony cocoons of *Coccidæ* (*Eriopellis*), some of which were found by Mr. F. Moore on blades of grass at

Ilfracombe; and others were found by Mr. Waterhouse on blades of grass in the Warren of Folkestone. M. E. A. Fitch remarked that *Eriopeltis festucae* had been recorded as British at a meeting of the Society held about thirty years ago.

Mr. Douglas sent for exhibition leaves of *Euonymus japonicus*, received from M. Lichtenstein, infested by *Chionaspis euonymi*, which occurred in great numbers at Montpellier and Nismes, and always destroyed the shrubs attacked by it.

The President exhibited specimens of *Tettix australis* (Walker), received from Mr. Oliff, of the Sydney Museum, who had captured them at the River Nepean, New South Wales. Mr. Oliff stated that the insect was decidedly sub-aquatic; he had found the insects not only on the surface of pools of water, but also eight or ten inches below the surface on the stems of water plants,

Mr. W. F. Kirby exhibited, on behalf of Mr. Ralfe, several specimens of *Lycæna corydon* of a very extraordinary character.

The Rev. W. W. Fowler exhibited a specimen of the almost unique beetle, *Harpalus calceatus*, taken by himself at Bridlington, Yorkshire; also a specimen of *Apion Lemoroi* (Brisont), a new French *Apion* taken on the coasts of Normandy and Brittany. He also exhibited several species of British *Helophori*, and read notes on their synonymy.

Mr. H. Goss read an analysis of M. Brongniart's recent work on "Les Insectes Fossiles des Terrains Primaires" (Rouen, 1885), and expounded that author's views on the Classification of Insects from Geological data.

The Rev. W. W. Fowler read notes on "A small collection of *Languriiacæ* from Arran, with descriptions of two new species."

Dr. Baly communicated a paper entitled, "Descriptions of new genera and species of *Galerucidae*."

Mr. T. Edwards communicated the first part of a synopsis of British *Homoptera-Cicadina*.—H. Goss.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting of January 28th was well up to the average, and a very interesting discussion on *Limenitis Sibylla* took place, the subject being introduced by Mr. Russell, who has had great experience of this species in its favourite haunts at the New Forest—more particularly in the larval state. He stated that the larvæ, which are full fed about the first or second week in June, are in the habit of feeding upon the shoots of honeysuckle, trailing along the ground, but after a sharp shower of rain they ascend the climbing

stems, and consequently then is the best time to obtain them. He reared every one he obtained, so that the species is apparently very little troubled with parasites.

Among the exhibits may be mentioned a fine series of *E. Ochroleuca*, varieties of undersides of "Blues," and a specimen of the rare *M. Salicalis*, all shewn by Mr. Clark.

At the next meeting Mr. Anderson stated that while searching for *H. rupicapraria* on January 30th, he was surprised to find many specimens of *C. brumata* in very good condition, and asked whether its occurrence at this time was usual. Several members spoke to having observed it about Christmas time, but the date mentioned seemed to be later than any known.

Attendance was then drawn to the agitation respecting the pollution of the river Lea, formerly a favourite entomological locality, and a resolution was passed in condemnation of the Tottenham authorities, and supporting the committee, who are endeavouring to obtain its purification.

February 4th was devoted to members' experiences during the season of 1885, the subject being opened by Mr. Lewcock reading an interesting paper which we give elsewhere. Most of the members took part in the proceedings, and the following species were mentioned as having been unusually abundant: *G. flavago* and *E. lucipara*, and *Coccinella 7-punctata*, and *11-punctata*.

At the meeting of Feb. 18th, the adjourned discussion of experience during last session was continued, and the new book on larvæ, just published by the Ray Society, was placed on the table, and excited considerable attention.—ERNEST ANDERSON, Secretary.

NOTES AND OBSERVATIONS.

NOTE ON THE LARVÆ OF *L. PUTRESCENS*, *H. HISPIDA* AND *S. ANOMALA*.—Having arrived in the neighbourhood of Torquay after an absence of some years, I thought I would make an excursion to the haunts of the above local species, with a view of ascertaining if they were still obtainable in their old localities, viz., the rocky slopes above the sea. So in company with an old entomological friend we started off on the evening of the 8th, armed with the necessary lantern, and a goodly supply of boxes, to visit our former hunting grounds. We were not very sanguine as regards *putrescens*, that species having been all but annihilated by the raids of collectors some twelve or fourteen years ago. It was freezing hard on the land above the rough slopes, but as we descended the apology for a path which leads to the sea, we were glad to observe that the grip of Jack Frost relaxed; and it was not long before my friend called me to see the first specimen of *S. anomala* larva,

busy with a green blade of the rough sedgy grass on which it feeds; the larva is a pretty apple green with thin white dorsal line and a broad white spiracular band; it sits on the blade of grass with the head raised like a *sphinx* larvæ; a few steps further and I caught sight of a *putrescens* feeding on the fine hair grass common in the locality; this larvæ is of the usual *leucania* type, but has a white (almost silvery) dorsal line, the ground colour is pale fawn. Having thus assured ourselves of the occurrence of this species we were in search of, we set to work with a will, and in two hours had each boxed a goodly number of the larvæ of both species, about half grown. We then shifted our quarters in search of *hispidæ*, which has its own special haunts, and were not long in finding its obscure looking grey larva, dotted with black. As we had already made a good capture of the imagines of this species last autumn, we were satisfied with a few examples of its larvæ, and wended our way in search of well earned refreshment, and by no means dissatisfied with our evening's work, which we hope to renew on future evenings, when the weather permits.—E. ROPER CURZON, Marychurch, Torquay, Feb. 11th, 1886.

NOTES FROM NORTH WARWICKSHIRE.—The weather throughout January having been exceptionally severe this year, moths are consequently very late in making their appearance. The only species which has yet occurred is the hardy hale *Hybernia rupicapraræ*, the first of which I saw on a shop window on February 12th fully three weeks late. From the same cause vegetation is very backward, and no larvæ are yet to be found—in fact there is no work to be done at present with the exception of pupa-digging, but this is fearfully cold and stiffening.

St. Valentine's Day was beautifully bright and mild here. We could almost imagine it to have been April; the birds were singing with all the strength of their spring notes—Skylarks, Thrushes, Blackbirds, Redbreasts, Accentors, Wrens, and Tomtits were all trying to rival one another in excellence. Insects too were awakening from their long winter slumber—great clouds of gnats were to be seen swaying to and fro in the sunshine, and the familiar buzz of the housefly has for the first time been heard this season. Among the flowers we observed the daisy, groundsel, chickweed, and wild strawberry—not a very large list, but not surprising considering the severe weather we have experienced since the beginning of the year.—W. HARCOURT BATH, Sutton Coldfield, 15th February, 1886.

THE BIRMINGHAM NATURALISTS FIELD CLUB.—Many readers of the *Young Naturalist* will learn with regret that this club has ceased to exist through lack of support. It was started, as is well remembered, by Mr. W. Harcourt Bath in the year 1881, and great has been the amount of work it

has done since its commencement. One of its principal prints will be the publication of a "List of the Lepidoptera of the Birmingham District," with notes and localities, &c., the result of practical research by its members. This and all other matter collected by the Club is left in the hands of Mr. Bath. The *Birmingham Naturalists' Gazette*, a monthly magazine and organ of the Club, has preserved in print many interesting jottings connected with its transactions. Copies of the *Gazette* will be forwarded to anyone on receipt of a stamped addressed wrapper to the late Secretary, JOHN PERCIVALL, F.Sc.S, 45, St. Stephen's Avenue, London, W.

ENNOMOS AUTUMNARIA AT LEEDS.

In September, 1884, Mr. James Terry, a local collector of Macro-lepidoptera, exhibited at a meeting of the Bradford Naturalists Society a specimen of Geometer, which he had recently taken flying about in the Leeds market, and considering that he had captured it with his hand it was in fair condition. I named it *Autumnaria* at the time, but as I was not quite certain brought it home and compared it with one of Mr. Tugwell's bred specimens, very kindly given me by Mr. Porritt, and was glad to find my surmise as to the species correct. I think there can be no doubt that the specimen had been imported in the pupa state amongst fruit, as plum, apple, pear, &c., are given as food plants, and I do not attach much value to the record, but give it merely as an instance of the transportation of a species from its home to a foreign country.—J. W. CARTER, Bradford, Feb. 1st, 1886.

ENTOMOLOGICAL NOTE—A COMPARISON.—To-day, February 7th, although the frost was very severe, we have had a good long walk in search of the early moths, but our efforts were only rewarded by the capture of a solitary male specimen of *Hybernia leucophearia*; from an examination of hundreds of trees we came to the conclusion that *P. pilosaria* had not yet emerged, if indeed there are any to emerge, as in the locality visited to-day—Shipley Glen—only one specimen, and that a female, was taken during last season.

It will be interesting, however, to note this year its appearance in relation to its normal numbers. In 1884—a mild abnormal spring—*P. pilosaria* was taken as early as January 16th, *H. leucophearia* and *Progemmaria* on the 20th, and by the 3rd of Feb., all the three species were quite common in one or another part of this district.

In 1885 *Leucophearia* was first noticed on Feb. 1st, *Pilosaria* and *Progemmaria* on the 1st of March.—J. W. CARTER, Valley-street, Bradford.

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THE INSECTS OF LLANGOLLEN AND ITS VICINITY.

By JOSEPH CHAPPELL.

Read before the Lancashire and Cheshire Entomological Society, February 22nd, 1886.

IN September last I received, from an Oldham entomologist, a copy of the *Young Naturalist*, accompanied by a note drawing my attention to a paper which had been read before this Society, by our worthy friend Mr. Wilding, entitled "A Day at Llangollen" (*Y.N.*, vol. vi. p. 201), and also requesting me to enlighten the readers of that periodical with reference to *Miscodera arctica*. Being an Honorary member of this Society, I do not wish to appear to attack any of its members as if they had trodden on sacred ground; no, more praise to them for venturing to unravel the mysteries of that beautiful country!

So far as Coleoptera are concerned, the district is very rich in numerous rare species. About twenty-five years ago I was a regular visitor at the late Mr. S. Carter's, to compare my undetermined specimens with the types in his extensive collection. He often drew my attention, during these visits, to a photograph of Mr. Joseph Ashworth's house at Llangollen, with a view of one of the adjoining hills, and he believed this to be the probable locality for *Sesia scoliaeformis*, which he told me he had often searched for in vain. One evening, as he sat smoking his pipe, on what he supposed to be the identical spot for this species, he was delighted to see *Prionus coriarius* on the wing. I received many invitations to accompany him to Llangollen, but never availed myself of the opportunity; but about twelve years ago I decided to visit and explore the district for insects, and went there about Whitsuntide, when after securing lodgings for a few days, I sallied forth armed with all my tackle. I have often been in other parts of North Wales, and have come to the conclusion that while tourists usually travel two or three together, and, if artists, betray their intentions by their sketching apparatus, scientific men

oftener travel alone, as if their investigations were too profound for them to wish for company. I had not proceeded far when I met what I took to be one of the latter class, decidedly not a native, and as I was desirous of finding out whether my surmises were correct, and as I could not ask him his business there, I enquired if he could tell me the way to the birch wood. He asked what I wanted a birch wood for, and on my telling him that I was an entomologist, I found he was a brother chip—Mr. Reston, of Stretford. At his suggestion we decided to ascend Oernant, in search of *Miscodera arctica*, and having secured a conveyance we commenced the ascent, after sheltering for a while from a drizzling rain, which, however, shewed no signs of abating. We were soon rewarded by the discovery of *Miscodera arctica* in abundance under stones, and we also captured *Cymindus vaporariorum*, *Byrrhus fasciatus*, *Pterostichus vitreus*, *Olisthopis rotundatus*. A specimen of *Anchomenus gracilipes* fell to the lot of Mr. Reston, and I captured a single specimen of *Lathrobium angusticolle*. While we were on the summit the drizzling rain changed to a thunder-storm, and it thundered and lightened incessantly, and rained in torrents; the wind threatened to tear to shreds the umbrellas, under which we crouched to shelter ourselves from the storm.

I have frequently been to Oernant since, and have taken *Miscodera* and the species above mentioned freely (except *Anchomenus gracilipes* and *Lathrobium angusticolle*, which have not since, to my knowledge, been taken there.) I have also taken the following: *Carabus arvensis*, sparingly; *Harpalus latus* and *honestus*, freely; also dark specimens of *Notiophilus aquaticus*; and a small blue variety of *Geotrupes sylvaticus*; *Amara acuminata*, under loose peat, rarely; *Hydroporus discretus*, in sphagnum, behind Oernant, freely; *Omosita depressa*, a single specimen under a stone.

I visited Llangollen on one occasion at Easter, during very cold weather, and found a few larvæ of *Chelonia plantaginis*, and one empty cocoon of *Saturnia carpini*. On the mountain opposite Valle Crucis Abbey, a little nearer Berwyn, I found *Metabletus truncatellus* under stones. By shaking the dead bracken, which lay on the mountain side, into my umbrella, I obtained *Mycetoporus lucidus*, *Pseudopsis sulcata*, *Micropeplus margaritæ*; and *Tetratoma fungorum* in fungi, on birch, which were much infested with the larvæ of *Cossus ligniperda* and *Sinodendron cylindricum*.

On the ascent to Casfell Dinas-Bran, in the flowers of *Linaria vulgaris* (toad-flax), I took *Gymnetron noctis* and *Meligethes distinctus*. The latter is the most active species of the genus I have seen. Just before arriving at the castle I took under stones a few specimens of *Otiorhynchus ligneus*. In August, I found under a stone, at a short distance from the castle, a nest of *Myrmica nodicornis*, consisting of males and workers. The late Benjamin

Cooke informed me that this species had not previously been taken in Britain since 1825, when it was found by Mr. Curtis, in Scotland. Behind the castle I beat out of hazel *Gonioctena pallida*; *Apthona herbigrada*, the latter not common. I took *Dacne (Tritoma) bipustulata* on decayed oak, in a wood near the Eglwyseg rocks.

I must call your attention to the Eglwyseg rocks, which have become famous as the locality for the following insects, which may be taken there at sugar about the beginning of July: *Mamestra furva*, *M. abjecta*, *Agrotis pyrophila*, *A. lucernea*, and *A. Ashworthii*. On the summit of the Eglwyseg rocks is a pine wood, which is deserving of attention. I found a larvæ of *Geometra papilionaria*, on hazel, near Castell Dinas-Bran.

About the latter end of May and beginning of June I have taken the following beetles: *Quedius auricomus*, in moss growing in streams and waterfalls; *Stenus Guynemeri* and *Dianous cœrulescens*. To obtain these, press the moss under water for a few minutes, when the beetles will come to the surface to see what is the matter. Under stones on the edge of the streams, and near the waterfalls, I have met with *Listera pubescens*, *L. punctata*, and *L. Sharpii*. Beating gorse bushes produced *Apion ulicis*, *Crepidodera rufipes*, and *Cryptophagus vini*.

I have found a single specimen of *Miscodera arctica*, together with other common beetles, on Barber's Hill.

On *Sisymbrium officinale*, always covered with dust, growing by the road-sides, by beating into the sweeping net I have obtained *Phyllotreta atra*, *Psylliodes cupro-nitens*, *Ceuthorrhynchus cyanipennis*, *C. contractus*, *C. quadridens*, &c. On *Lamium album* (white dead-nettle), by carefully beating into the net I have taken *Meligethes difficilis* freely, and *M. Kunzei* rather rare. On the leaves of the mallow I got *Apion æneum*, *A. radiolus*, *A. rufirostre*; and on *Scrophularia nodosa*, I found *Cionus pulchellus* and *C. scrophulariæ*. (Mr. Sidebotham met with *Cionis similis* and *C. blattariæ*, I believe, on Mullein.)

On a putrid fungus, one of the *Polypori*, growing on a tree root by the road-side, going towards Valle Crucis, I once found a large number of species, viz.: *Ducne (Engis) rufifrons*, in abundance; *Agathidium varians*, sparingly; *Epuræa deleta*, freely; *Bolitobius atricapillus*, *B. exoletus* and *B. pygmæus*, freely; *B. trinotatus*, sparingly; *Scaphisoma agaricina*, freely; and several species of *Homalota* and *Gyrophæna*. On the opposite side of the road was another fungus of the same kind, in which the same species of beetles abounded. When once this fungus, which grows very generally in the neighbourhood, attacks a decayed tree it never leaves it while there is any left.

From a turn in the Ruthin road a stile path leads to the wood behind

Valle Crucis, and by beating the hedges near here I have obtained *Telephorus fuscus* and *T. pellucidus*; and on oak behind Valle Crucis Abbey I have taken *Balaninus villosus*, *Telephorus obscurus*, *Pogonocherus hispidus*, *P. dentatus*, *Liopus nebulosus*, *Anobium fulvicorne*, *Rhynchites æneovirens*, *Celiodes rufus*, and *Acalles roboris*. Beating birch produced *Polydrusus pterygomalis*, *Phyllobius maculicornis*, and many other common species. Under bark of decayed oak I took *Melanotus rufipes*, and my son found a specimen of *Scaphidema ænea*. By beating dead fences I obtained *Orchesia micans*, *Magdalinus aterrimus* and *Cistela luperus*, the latter just behind Valle Crucis. On hedges, railings, &c., I got by beating *Callidium alni*, *Clytus arietis*, *C. mysticus*, *Polyopsia præusta*, *Toxotus meridianus*, *Hedobia imperialis*. I took *Ceuthorrhynchus urticæ* by sweeping nettles; *Pyrochroa coccinea* under bark of decayed elm and alder; under bark of dead ash *Rhyncolus lignarius*; *Opilus mollis* also under ash-bark and by beating. *Pyrochroa serraticornis* occurred on the banks of the Canal. I took one specimen of *Selenia lunaria* near Valle Crucis; and one *Anaitis plagiata* on the Ruthin road, by beating hedges. *Sesia scoliæformis* is said to occur in the birch wood behind Valle Crucis Abbey. Mr. Walkden has taken *Choragus Sheppardi* once; Mr. Sidebotham has met with *Aphodius sticticus* in dung; and Mr. Morley has taken *Hister 12-striatus* in dung-heaps.

On the same side of the river, but a little beyond Berwyn Station, I have beaten out of thorn bushes *Corymbites ænens*; *C. holosericeus* and *Cistela murina*, freely.

On the banks of the Dee I have taken the following, viz.: *Bembidium punctulatum*, *B. prasinum*, *B. decorum*, *B. tibiale* and *B. atrocæruleum*. In very shallow parts of the river I have taken *Hydroporus septentrionalis*, and *Orectochilus villosus* under stones; this species is said to swim on the surface of the water at night. I have also found *Elmis parallelipedus*, and this species is best obtained by raising the stones out of the water for a time, and allowing the water to run off them, when, as the stone dries, the beetles, hitherto undistinguishable, begin to seek another situation. I have also found under stones on the river banks *Limnebius truncatellus* and *L. popposus*.

I have taken *Melandrya caraboides* freely in decayed trees; *Sinodendron cylindricum* common in old gate-posts, and in decayed ash, birch, maple, &c. *Brachytarsus fasciatus* and *B. varius* by beating thorn bushes; and a few *Tomicus bidentatus* under pine-bark, in a timber yard near the station. Mr. Taylor has taken *Telephorus abdominalis* on Umbelliferæ.

About 1877, I devoted some time at the beginning of August to searching for *Metæcus paradoxus* in wasp-nests. After I had carefully scoured the

district for nests I sallied forth armed with a spade and some gunpowder, and succeeded in taking eight nests of *Vespa vulgaris* and *V. germanica*, and in these I found a good series of the desired beetle; and a friend who tied the nests in a bag and took them to Manchester bred a few more from larvæ feeding in them.

VARIATION IN LEPIDOPTERA.

INTERMEDIATE FORMS.

By C. S. GREGSON.

Mr. Robson (page 26, *Y.N.* for February, 1886), in discussing this question, says he fails to see how he has been so much misunderstood, and that his point expressly was that there were intermediate forms, but that in certain cases where there "were two well marked forms of an insect, whether sexual or otherwise, the absence or rarity of intermediate forms seemed to require explanation. My argument as to sexual variation Mr. Gregson does not notice, yet this is a very important element in the case"; and further on he says, "I may be mistaken in asserting that where the sexes differ there are no intermediate forms, but I ask Mr. Gregson or any one else to point out a case to the contrary, and I ask further if there are no such intermediates, or if there are but few, why is it so?" If reference is made to my little paper on the subject, it will be seen that I say "I shall not follow Mr. Robson's interesting paper, but at once write out," &c. It may be that my hurry or stupidity, or both, has led Mr. Robson to fail to see *my point in the second species named* (*Papillio merope*). This is an African species, ranging from Bonny and Cape Coast Castle to the Congo in West Africa, and to Natal in South Africa (to my knowledge) and is a yellow and black insect; the costal stroke broadens out into a black tip, with a little yellow patch in it, and continues on to the hinder angle, narrowing as it goes; underwing yellow, with three black patches, and a few marginal but very variable yellow spots; *tails long*, sometimes the tail has a dark streak down the middle, sometimes the anal blotch is continued down the side of the tail also, at other times the tail is pure yellow—these are always males; expanse (West Africa) $4\frac{3}{4}$ ins. to 5 ins. (South Africa) 4 ins. to $4\frac{1}{4}$ ins. *Papillio hypocoön*, on the West coast of Africa, so far as I know (and I have had hundreds from different rivers on that coast at different times) is always a pearly white, with a broad black-brown patch; upper portion of wing with a small light elongate patch above the disk, then a large pearly white patch across the wing (somewhat ovate), a small white spot near the tip, and two

small light spots near the base of the wing; behind, the pearly white broadens out towards the disk; underwings pearly white, with a broad rayed dark hind portion having faint pearly dots round its margins; *no tails*; expanse over 5 in. on the West coast. These are the females of *P. merope*:—

Variety 1.—Has underwings slightly suffused with ochre.

Variety 2.—Underwings bright red ochre.

Variety 3.—All the pearly white spaces bright red-brown ochre.

In all the wings expand from 4 to $4\frac{1}{4}$ ins. Common on the South African coast, always small as compared with West coast specimens, and commonly ochreous. These are the females of *P. merope* also; the males in South Africa being like the males of *merope* in West Africa, but always much smaller. My mistake seems to have been, that I neglected to say *P. hypocoön* was the female of *P. merope*; this explained I think I may fairly say I have answered our good friend's challenge to "name a case to the contrary." I was assuming everybody knew *P. merope* and *hypocoön* as well as I did! Now I have differentiated them fully, perhaps the question will not be so obscure; but in answer to his further question—"I ask further, "if there are no such intermediates, or if there are but few. Why is it so?" I confess I cannot tell him why. Nature has not revealed all her why's to us, but whilst on this subject let us see if we cannot find cases nearer home than Africa. First, We all know *Sinapis* males and females differ, yet it often happens that the female markings approach the male so closely that we depend upon the form of the wing (its rounder tip) rather than upon the markings, for sexual separation, whilst at other times it is devoid of the usual of mark at the apex of the superior wing. Again *Potatoria*, male and female differ. I possess light males, creamy buff and light females, the Wicken Fen form, creamy buffs, and dark females, but then Mr. Robson's question, "How many specimens have they been selected from," may have some force here, but passing *B. Trifolii* let us look at *B. quercus*: here I think we may fairly reach safe ground. Taking *B. quercus* as figured by Hubner, and Westwood and Humphreys, *both bad figures* I admit (perhaps the worst figures in each book), we have the South of England form with its straight band on superior wings and rounded band on underwings; the entire want of a basal patch, its rich fulvous uniform colour in the male, and the same form of marking in the female, *almost straight across the wings*, and the unicolorous, but lighter colour; then the male feeds on brambles, &c., in lanes (H.D.) Then we have the rich brown males of our coast, with the invariable great light shoulder patch, and great rich coloured females, much larger than the southern *quercus*, requiring only one year to complete their meta-

morphos, and having the band across the upper wing curved, and the underwing band swept outwards at the angle of the wing, forming an heraldic shield when the insect is well set; feeds on *Salix fusca* on sand-hills. Next we have the moor or moss fed species, *B. roboris* of Std., deep richer brown, still hardly ever having any indication of a shoulder patch. Sometimes without band on the underwings, often only a faint line on both male and female; it is in this group that intermediate varieties occur, where the male coloration sometimes approaches the female and that of the female sometimes assimilates to male colorisation. It is in this group also that the scaleless specimen occur most freely, but that, I only name incidentally, it has nothing to do with the question before us. Variety are those intermediate forms when male and female of a species differ.

I will give another home illustration, which cannot be controverted, *Saturnia Carpini*. I possess several intermediate specimens of females having almost male colouring, the only light grey upon them being the "white of the eye," as seen in the upper wing of the male, which gives the exact representation of the human eye; but I may be met again with the remark, "Yes, but you don't tell us how many specimens you bred before you got these together." To that I say, all the specimens ever bred or captured, either of *Carpini* or *Betularia*, are a mere dot as compared to the number developed naturally, hence the doubt about their fewness proves nothing, but the fact that one puny collector can breed or capture several specimens proves that there are great numbers at large. Again, *Didymata* has distinct male and female forms, and intermediate forms are plentiful, some females approaching the male, and some males approaching the female. Some, nay most females here, are dark, whilst at Windermere they are all much lighter, and those brought from Hoy, by Mr. Curzon are almost white. But leaving the British Isles let us go to Germany to *V. Levana*.

Vanessa prorsa is a large species (comparatively), very dark, with a white band across the wing, like a miniature *Liminitis sybilla*.

V. levana, spring form of the above, is rather like a miniature *C-album* in colour; no white band; and

V. Parina is quite as large if not larger than *Prorsa*, but not so dark, and the white broken band has become reddish-yellow.

These are the three broods of *Vanessa prorsa*—spring, summer, and autumn. Surely one of these three is an intermediate variety. I quite agree with Mr. Robson that it would be well to know the causes of variation in general, and I think a good deal can be done to elucidate it, but I am no inductive philosopher or speculative theoriser—I am merely a practical naturalist, and give these illustrative facts, leaving to others

the speculative questions. That I could give other illustrations of variation where male and female differ will be patent to practical men, and when I say I have three well marked forms of male *Liparis dispar*, viz., the rich cold dark brown form, the fulvous brown form, common to everybody, and a series of the light banded form bred by somebody at or near Darlington recently. I have this form 40 years old, the ground colour being almost as light as in the female, with a broad dark margin. Mr. Robson says in page 210 *Young Naturalist*, "Wherever there are two well marked forms of an insect, whether sexual or otherwise, the absence or rarity of intermediate forms seems to require explanation." Now, though I could lengthen this list of species having intermediate forms, without leaving my chair, I confess I could no more explain the absence or rarity of intermediate forms, than I could why or for what purpose the female of *Parnassus mnemosyne* has the hollow sac beneath its abdomen, whilst no other *Parnassus* has any such sac.

Another question answered and I conclude. Mr. Robson asks from how many specimens my series of intermediate forms of *Betularia* were selected. They were principally purchased from *two breeders*, at so much per dozen—"take any color or form you like, plenty of all sorts to pick from"; but I may say the dark speckled form is the rule at Bidston Hill, where I used to collect its larva, and I never bred aught but black ones from Simond's Wood Moss. The first is a dry sandstone hill, the latter is a wet turf moss, in both places the larvæ fed upon birch! Thus, I think, Mr. Robson's interesting question is brought to an issue. Mr. Robson asks what proportion did the type and the black form bear to the intermediates? When I purchased the South Lancashire bred specimens the proportion was, as near as I recollect, about equal, light and intermediate, the other half black; all I have bred from Simond's Wood Moss were black, and all I have bred or captured at Bidston Hill intermediates; from Warrington (see N. Greening's paper) half light, half dark, no intermediates, bred repeatedly; from Grange-in-Cartmell all light, hundreds of larva taken on birch, growing on Carboniferous limestone. Knowing these facts let us apply them.

REPUTED BRITISH LEPIDOPTERA.

By JOHN E. ROBSON.

No. 6. CUCULLIA ARTEMISIÆ, FAB.

In all the older lists of British Lepidoptera appears the name of *Cucullia Artemisiæ*, Fab. I find it so recently as 1846, in the second edition of Hawley and Evan's "Catalogue of British Lepidoptera"; but in 1850 Mr.

Doubleday consigned it to the "Reputed British Noctuæ." Not having the work of Fabricius to refer to, I do not know what his *Artemisiæ* really was. No reference to Fabricius appears in Staudinger, and *Artemisiæ*, W.V. was the name given in Stephens's when he introduced it to the British Lists. This insect is described in Stephens's as follows :

"Sp. 13. ARTEMISIÆ. *Alis anticis viridibus, maculis argentatis; posticis albidis, margine dilutione cinereo* (Exp. alar, 1 unc. 6 lin.)

No. *Artemisiæ*, Wien. V.—Cu. *Artemisiæ*. *Steph. Catal. part ii. p. 104. No. 6366.*

Head and thorax silvery-white, with greenish transverse lines; anterior wings bright clear green, with seven or eight silvery spots, one placed at the base, very large, and giving off a twig on the inner margin of the wing, then a geminated one, divided by a longitudinal dusky streak, and edged on the inner margin with the same; this is followed by a second geminated spot of an ovate form and smaller size, also divided by a dusky streak; on the costa, at the apex, is a large flexuous one, and parallel with the hinder margin is a linear elongate one; the hinder margin is silvery; and the cilia white; posterior wings white with a pale dusky border; cilia also white.

Caterpillar slightly pilose, green, spotted with white, with a dorsal and lateral series of red tubercles—it feeds on the *Artemisia sylvestris*—the pupa is green, and folliculated; the imago appears in June.

This conspicuous insect evidently differs considerably from its congeners, both in its primary and final stages; its larva being pilose and warty; and the imago having its wings adorned with brilliant metallic scales, and being of a different form to those of other species, by the former character beautifully leading the way to the brilliantly ornamented *Plusiæ*. I have, however, not thought proper to discriminate it further from the other *Cuculliæ*.

One example only of this remarkably beautiful insect has hitherto been captured in Britain: this was taken about 20 years ago, near 'Dedingstone, by Mr. Shelton.'—*Dr. Leach.*"

I have quoted Stephens in full that it may be clearly understood what the insect was, that was supposed to be British, and also, that only one example of it was known. The cabinet specimens then introduced were supplied by dealers, and were unquestionably foreign. Mr. Doubleday, in his investigations in preparing his list, found that the species known here and in France as *Artemisiæ*, Fab., was known in Germany as *Argentea* of Hufnagle, Rottemburg, Knock, and Esper. A specimen is before me as I write, with the label in Mr. Doubleday's well-known handwriting, "*Cucullia argentea (artemisiæ).*" The name was allowed to stand among the reputed Noctuæ without synonymy, and it appears there in both editions of the List simply as "*Artemisiæ*, Fab." To have added other names and authorities would have only increased the error, as it was not intended to recognise any such species as British. Besides as Doubleday did not adopt the nomenclature of Hufnagle and Rottemburg, *Artemisiæ*, the name in the Vienna Catalogue, would still have had precedence, indeed I do not understand why it was not *Artemisiæ*, W.V. from the first, as it was in Stephens. A friend of mine suggests that some of

the insect dealers change the names of species in the interests of their trade, not of science. In this instance the change and the absence of synonymy in Doubleday's list has led to an amusing blunder. Those who read my article on *Callimorpha Hera* in the *Young Naturalist* for January (p. 6) will remember a story told there of a very beautiful insect bred some years ago by my friend Mr. Gardner, from a pupa sent him as *C. gnaphalii*. The insect in question, new to both of us then, was the *C. artemisiæ* of Stephen's Illustrations and Doubleday's List. No doubt it had been imported with fraudulent design, but when sent as *Gnaphalii* it had evidently "got mixed." It was the *Argentea* of Hufnagle and the Germans, the name *Artemisiæ*, being appropriated there to another of the genus known elsewhere as *Abrotani*, W.V. Fab., &c. In that article I suggested that pupa of *Hera* had been introduced to Starcross, which, of course, might be done without any other design but to establish the species in England. I also suggested that they might have been imported from France. It seems now more likely that they were obtained in Germany, for I assume the pupæ of this *Cucullia* had come with them from the same place. Had the importer applied in France for pupæ of *C. artemisiæ*, it is quite likely he would have obtained what was wanted—the species that had been reputed to be British. Getting them from Germany he was naturally supplied with the insect called *Artemisiæ* there. Mr. Brooks, in hunting for *C. Hera* where he had taken them before, found a pair of the *Cucullia* as recorded, applied through his unnamed friend to Mr. Butler of the British Museum, (by the way how could his friend know it to be a RARE *Cucullia* when he could not name it), Mr. Butler knew the species, if neither Mr. Brooks nor his friend did, and told them it was *Cucullia artemisiæ*, but evidently to guard against error, he added *abrotani* as a synonym. Mr. Brooks then sent the record to the *Entomologist*, where it was printed with an Editorial foot-note announcing that "*Cucullia artemisiæ* has long been in the list of reputed British species, and now enters our fauna upon the identification of Mr. Butler, of the British Museum." The foot-note ends with a "description of *C. artemisiæ*:—Expanse, one inch and three-quarters. The anterior wings are narrower than those of *C. absinthii*; ground colour dark gray, varied with paler; transverse lines somewhat distinct; inner margin less dark than in *C. gnaphalii*; inner line with deep indentations, the elbowed line being sharply broken over the inner margin; the stigmata are both light, with darker centres and borders. Posterior wings are like those of *Cucullia absinthii*." If readers will refer again to Stephens' description of his *artemisiæ*, they will see what a very different insect it was to that now proposed to be introduced. I am taking it for granted that the specimens were really captured as stated, notwithstanding the doubt the

Editor of the *Entomologist* casts upon the statement by his reference to the date (I have known other *Cucullias* appear at an abnormal date at large), but that the pupæ were not British. The *Artemisiæ* of the old lists was an insect likely enough to occur in Britain. Its range, according to Staudinger, is over Northern, Central, and Southern Europe, extending to the Southern parts of Sweden, and through Hungary to Central and Southern Russia. The species now announced has a much more restricted range, and not extending in this direction at all. Germany, Switzerland, Hungary, Poland, Livonia, Sweden (Southern), Russia (Central and Southern), &c., being the localities given by Staudinger. Young Naturalists must therefore be careful before they part either with their rarities or their cash for these reputed species. Old Naturalists can take care of themselves.

EARLIEST AND LATEST DATES OF A FEW SPECIES OF LEPIDOPTERA AT GLANVILLES WOOTTON.

By C. W. DALE.

HYBERNIA LEUCOPHÆARIA.

	<i>Earliest.</i>	<i>Latest.</i>
1865—February	7	March 7
1867—February	2	February 23
1868—January	29	
1869—January	20	February 2
1870—February	24	March 3
1871—February	8	March 1
1872—February	1	February 23
1873—January	26	March 4
1874—January	27	March 4
1875—January	27	February 12
1876—February	17	
1877—January	16	
1878—February	8	
1879—March	5	
1880—February	23	

HEUSIMENE FIMBRIANA.

	<i>Earliest.</i>	<i>Latest.</i>
1872—March	11	
1876—May	1	

TORTRICODES HYEMANA.

	<i>Earliest.</i>	<i>Latest.</i>
1865—February	23	April 4
1866—February	8	
1867—February	12	
1868—February	20	
1869—January	20	March 12
1870—March	2	April 2
1871—February	13	April 4
1872—February	6	April 3
1873—February	15	
1874—January	27	
1875—February	2	April 14
1876—February	15	
1877—February	3	
1878—February	8	
1879—March	7	

HEUSIMENE FIMBRIANA.

	<i>Earliest.</i>	<i>Latest.</i>
1868—April	3	
1871—March	22	

1879—March	7
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EXAPATE GELATELLA.

<i>Earliest.</i>		<i>Latest.</i>	
1863—December	24		
1868—December	9		
1869—January	7		
1872—December	4	January	2
1874—November	30		
1876—November	28		

TÆNIOCAMPA CRUDA.

<i>Earliest.</i>		<i>Latest.</i>	
1866—March	27	April	9
1871—March	21		
1872—March	6		
1874—April	6		
1876—March	3	April	24
1879—May	7		

XYLOCAMPA LITHORHIZA.

<i>Earliest.</i>		<i>Latest.</i>	
1869—March	12		
1873—March	29		
1874—April	1		
1875—March	27		
1876—March	22		

DIURNEA FAGELLA.

<i>Earliest.</i>		<i>Latest.</i>	
1869—March	17		
1871—March	22	April	3
1872—March	11	March	30
1875—March	31	April	24

CHRYSOCORYS FESTALINELLA.

<i>Earliest.</i>		<i>Latest.</i>	
1871—March	24		
1872—March	11		

OCNEROSTOMA PINARIELLA.

<i>Earliest.</i>		<i>Latest.</i>	
1872—March	4		

EUPITHECIA ABBREVIATA.

<i>Earliest.</i>		<i>Latest.</i>	
1868—April	6		
1872—March	12	March	25

ANISOPTEREX ÆSCULARIA.

<i>Earliest.</i>		<i>Latest.</i>	
1867—February	23		
1872—March	8		
1873—March	4		
1874—February	25		
1877—March	28		
1879—April	10		

HYBERNIA PROGEMMARIA.

<i>Earliest.</i>		<i>Latest.</i>	
1866—March	29		
1869—February	6		
1872—March	5		
1874—February	25		
1879—March	27		
1882—April	1		

PHIGALIA PILOSARIA.

<i>Earliest.</i>		<i>Latest.</i>	
1867—February	9		
1874—February	4		
1876—February	15	February	29

BOARMIA LARICARIA.

<i>Earliest.</i>		<i>Latest.</i>	
1871—March	14	April	3
1872—March	30		
1876—March	10		

TRACHEA PINIPERDA.

<i>Earliest.</i>		<i>Latest.</i>	
1876—February	26		

OCNEROSTOMA PINARIELLA.

<i>Earliest.</i>		<i>Latest.</i>	
1872—March	4		

EUPITHECIA IRRIGUATA.

<i>Earliest.</i>		<i>Latest.</i>	
1868—April	15		
1871—April	28		
1875—April	21		
1877—May	17		
1879—May	19	June	4

SIX MONTHS' WORK AMONG THE
TORTRICES AND TINEITES.

By ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

Author of "*The Entomological Year*," "*Hints and Helps for Young Entomologists*," &c., &c.

Within the shelter of a rolléd leaf,
Drawn round with cunning skill, and deftly tied
With silken thread, the little Tortrix lives.

APRIL.

Although the Micro-lepidoptera are not generally popular among young naturalists, yet the natural history of these small moths is very interesting. Certainly they do not make by any means so fine a show in a cabinet as their bigger brethren, but he who makes collecting his sole object, and troubles himself naught about the habits of the insects he impales in his camphored drawers, can only by a perversion of words be termed an "Entomologist." Many, however, who would like to do something in the micros as well as the macros, are deterred from attempting their study by the difficulty of naming their specimens. From letters I receive I know there are many such among the readers of the *Young Naturalist*, and I have been asked to write a series of papers on the subject of the *Tortricina* and *Tineina*. Although my time is now very limited, I willingly accede to the wishes of my correspondents, and will do my best to be of service to them and the other entomological readers of this magazine, and if my papers should prove some slight assistance to tyros in the study of Micro-lepidoptera, I shall feel myself amply repaid for any trouble their compilation may put me to.

I proposed originally to term this series "Hints on naming Tortrices and Tineina," and had in view the giving a full analysis of the two groups and the families and genera of which each is composed, but it was suggested to me that if the papers were written in the same style as the two former series of papers I contributed to this magazine, and which dealt chiefly with the Macro-lepidoptera, readers would find them easier to understand and be better able to profit by them. I shall, therefore, confine myself each month to a description of the species which occur in that month, and inasmuch as the readiest way in which a beginner can make himself acquainted with the differences between the species of these little, and frequently very variable moths, is by breeding them, I shall give prominence to descriptions of their larvæ.

The little caterpillars of the Tortrices are as a rule either leaf-rollers or feed between united leaves, some, however, are internal feeders. Those of

the Tineites are generally either leaf-miners, case-makers, or burrowers inside the stems of plants, but not only their manner of feeding, but their food also, varies much more than in those of the Tortricina, and as we know to our cost, they do not confine themselves to a vegetable diet, but some species invade our houses and work havoc in cloth, fur, and similar substances—not even sparing our entomological or ornithological specimens, unless our butterflies or bird-skins are protected from their ravages by the free use of corrosive sublimate and other substances.

Every entomologist knows a tortrix larva at first sight. Its active wriggling movements when disturbed at once identifies it. We find the larger number of species in the summer months; very few kinds can be found now. One of these is the dull yellowish-white *Antithesia gentiana*, which differs in its habits from the leaf-rolling and leaf-uniting species, we see so abundantly later on in the year, by feeding inside teasel heads. The head and second segment are black and the body is spotted with pale green. At the time these pages are in their readers' hands these little caterpillars will have attained their full size and be ready to pupate. The moth I will describe in a future paper. *Eupacilia roseana* is another species to be found now in the teasel heads, feeding on the seeds. In colour it is green with a black head, and it occurs almost everywhere where teasel grows; thus differing from *gentiana*, whose habitat is the South of England. It is also smaller than the last-named species. Most of the tortricine larvæ we find now are internal feeders, as, for instance, the dull reddish-brown black-headed *Notocelia udmanniana*, which feeds inside the bramble shoots; the dull-brown *Spilonota roborana* in rose shoots; the pink black-headed *Halonota scutulana* in thistle stems; the yellowish-white, brown-headed *H. terrellana*, in stems and roots mugwort (*Artemisia vulgaris*), the local *Dicrorampha simpliciana* also feeding in mugwort roots; the pinkish-white *Dicrorampha petiverana*, in roots of yarrow (*Achillea millefolium*); the dirty-brown pale-headed *Hedya aceriana*, in the bark and young shoots of poplar; the abundant, green, black-headed *Bactra lanceolana* in stems of rushes; the pale yellow, brown-headed *Asthenia strobilana* in fir cones, and the scarce *Retinia turionana* in shoots of Scotch fir. The other Tortricina larva feeding in April are *Tortrix Forsterana* on ivy, honey-suckle, &c., and the greenish-grey, green-headed *Ditula angustiorana* on a variety of trees.

A few Tortrices may be found now in the imago state, as *Hedya pauperana*, *Cheimatophila mixtana*, *Semasia vacciniana*, *Ephippiphora argyrana*, *Asthenia splendidulana*, *Heusimene fimbriana*, and *Tortricodes hyemana*. *Pauperana* is scarce, but used to occur in Darent Wood, among wild rose-bushes. *Mixtana* is common in heathy places. *Vacciniana* abundant where

bilberry grows. *Argyana* abundant about oak trees. *Splendidulana* is widely distributed, and may be recognised by its glossy olive-brown wings, slightly arched costa, and pale pearly blotch on the middle of the inner margin, beyond which is a black dot. *Fimbriana* has wings three times as long as broad, dull ochreous-brown in colour, clouded and streaked with dark-brown, with whitish-grey blotch in the middle—not very distinct—and a silvery-edged rather indistinct ocellus. *Hyemana* is rather an anomalous insect, which seems neither a tortrix nor a tineite; it has semi-transparent greyish brown wings, expanding $9\frac{1}{2}$ to $10\frac{1}{2}$ lines. It is abundant in mild springs in oak woods.

The larvæ of the Tineina occurring now are rather numerous, and include the lichenivorous *Talæoporia pseudo-bombycella*, *Solenobia inconspicuella* and *Xysmatodoma melanella*. The first-named is whitish, with a black head, and lives in a long slender case; *inconspicuella* makes a three-sided greyish-green case, and *melanella* a rather short one. They all may be looked for on old palings. Other kinds are *Ochsenheimeria Birdella*, in grass stems; *Lampronia prælatella*, in a flat case on the underside of wild strawberry leaves; *L. rubiella*, in shoots of raspberry; *Plutella porrectella*, in gardens on dames' violet (*Hesperis matronalis*); *Depressaria assimilella*, in united broom twigs; *D. nanatella*, in leaves of carline thistle (*Carlina vulgaris*); *Gelechia rufescentella*, in tubularly rolled grass stems; *G. mulinella*, in flowers of furze and broom; *G. diffinella*, in a burrow near the roots of sheep's sorrel (*Rumex acetosella*); *G. affinella*, in moss on old walls (pinkish, head black); *G. domesticella*, red brown, head brownish black, larger than *affinella*; *G. vulgella*, between united hawthorn leaves; *G. tricolorella*, on leaves and shoots of greater stitchwort (*Stellaria holostea*); *G. instabilella*, in mines on leaves of sea plantain (*Plantago maritima*); *G. arundinetella*, in leaves of the common great carex (*Carex riparia*); *Glyphipteryx Haworthella*, on seeds of cotton-grass (*Eriophorum*); *Argyresthia ephippella*, in shoots of cherry; *A. glaucinella*, in bark of oak trees, horse chesnut, &c.; *A. goedartella*, in bark of alder and birch trees; *A. brocheella*, in shoots of birch; *A. aurulentella*, in juniper leaves; *Gracillaria tringipennella*, in plantain leaves; *G. ononidella*, in leaves of clover and rest-harrow (*ononis*); *Coleophora junci-lolella*, in a case formed of small-heath leaves; *C. solitariella*, in a cylindrical whitish case on greater stitchwort (*Stellaria holostea*); *C. vitisella*, in a blackish wrinkled case on cowberry (*Vaccinium vitis-idaea*); *C. albitarsella*, in a slender case on ground ivy and marjoram; *C. chaleo-gramella*, on field chickweed (*Cerastium arvense*); *C. pyrrhulipennella*, in a slender shining-black case on heath; *C. lixella*, which has very interesting trait of feeding on *Thymus serpyllum* when young—making a habitation out of the calyx of a

thyme blossom—and afterwards cutting out cases in grass leaves, and feeding on *Poa anna*; *C. discordella*, in a case on *Lotus corniculatus* (birds'-foot trefoil); *C. lineolella*, in a flattish, hairy, greyish case, on black fœtid horehound (*Ballota nigra*); *Chrysocista linneella*, under bark of lime trees; *Asychna æratella*, in pod-like galls on knot-grass (*Polygonum aviculare*); and *Stephensia Brunnichella*, on leaves of wild basil (*Elinopodium vulgare*). Even this long list does not by any means exhaust the number of the Tineite larvæ feeding in April, for besides the above there are nearly all the members of the genus *Elachista*. *E. trapeziella* feeds in the leaves of the common wood hairy rush (*Luzula pilosa*), it is greenish grey with a black head; the yellowish, brown-headed *E. magnificella* feeds in the same plant; *E. gleichenella* feeds in leaves of *Carex*; *E. albifrontella*, in leaves of various grasses; *E. cinereopunctella*, mines leaves of *Carex glauca*; *E. luticomella*, feeds in the leaves and stems of rough cock's-foot grass (*Dactylis glomerata*); *E. atricomella*, in the same; *E. Kilmunella*, in *Carex* leaves; *E. nigrella* mines leaves of *Poa trivialis*, and *E. Gregsoni* feeds in grass of the same genus; *E. bedellella* feeds in narrow-leaved oat-grass (*Avena pratensis*); *E. subnigrella*, in leaves of *Bromus erectus*; *E. perplexella*, in those of turfy hair-grass (*Aira cæspitosa*); *E. poæella*, in leaves of *Poa aquatica*; *E. megeriella*, in slender false-broom grass (*Brachypodium sylvaticum*) and similar grasses; *E. zonariella*, like *perplexella*, in leaves of *Aira cæspitosa*—*zonariella* is dull grey green with a pale brown head, while *perplexella* is whitish yellow; *E. gangaliella* feeds in leaves of *Dactylis glomerata*, as does also *E. cygnipennella*, they are both similar in colour but the former has two large pale blotches on the second segment—*cygnipennella* is by far the most abundant species; *E. cerusella* feeds in leaves of reed; *E. paludumella* in those of *Carex paludosa* and *C. paniculata*, and *E. biatomella* in *Carex glauca*; *Cemistoma spartifoliella* may be found under the bark of broom; *Bucculatrix aurimaculella*, on leaves of *Chrysanthemum leucanthemum*; *B. cristetella*, on leaves of yarrow (*Achillea millefolium*), and this will about conclude the list.

Several imagos of the Tineina are out in April, as the whitish *Chimabacche fagella*, so fond of resting on tree trunks in the spring; *Semiocopsis anellanella* and *Steinkellneriana*; the local *Micropteryx salopiella*; the purple, gold-spotted *M. semipurpurella*; the golden-green *M. unimaculella* and the golden, purple-reticulated *M. sparmannella*; the dark grey, violet-tinged *S. pyrella*; the hibernating *Zelleria hepariella*, *Z. insignipennella*, *Gracilaria stigmatella*, *Laverna decorella* and *Lyonetia Clerkella*. There are also one or two others which in mild seasons make their appearance at the end of the month, but as they are not very likely to be met with this year, I will defer their mention until May.

THE BUCKLER COLLECTION.

By JOHN HENDERSON.

Through the courtesy of the present owner, I have had opportunities to inspect this interesting collection on three occasions recently, and thinking the result may be of interest to the readers of the *Young Naturalist*, I have taken a few notes of its contents and general appearance.

The late Mr. William Buckler, of Emsworth, who was well known by the majority of our older entomologists, was noted chiefly for his indefatigable work amongst the larvæ of our British Lepidoptera. Most of the best descriptions of larvæ given in "Newman's British Moths" were from Mr. Buckler's pen, and being also an admirable artist, he has left a large number of life-like drawings, which the Ray Society are now publishing; the first volume of which, treating of the larvæ of our British Diurni, being already issued. A special interest, consequently attached to Mr. Buckler's cabinet, which contains the actual specimens bred from the larvæ he has figured, and which are now illustrated in the Ray Society's publication.

Unfortunately, in many instances, we are unable to identify the exact insect, but the notes in his cabinet index, are a valuable guide; and we are assured that all are included in his long rows of species, which remain undisturbed exactly as Mr. Buckler has placed them in the drawers. The collection is especially rich in bred specimens. To attempt to describe all would be impossible, row after row being in the finest possible condition. It would not be perhaps what is styled a modern collection, as it is not particularly rich in the varieties that are now so much sought after; the abnormal forms of *caja* and *grossulariata* (the Tigers and Magpies), so numerous in other cabinets, are not included. There are few of the montrosities which are so highly prized in some quarters. When we remember, however, that in a collection recently disposed of in public auction, the fine hermaphrodite *cardamines* (one wing male and the other of the opposite sex), turned out, on being subjected to treatment in a relaxing box, to be nothing but cleverly joined halves of each insect, wings of male being inserted with microscopic accuracy on the female, &c., we are led to infer that all is not gold that glitters, and an honest series is more worthy of a genuine entomologist, than manufactured varieties.

The greater part of this collection are unmistakeably in Mr. Buckler's own setting, but there are some valuable specimens, the gift of his old friends Henry Doubleday (of Epping), the Rev. J. Hellins, the Rev. Joseph Greene (of pupa digging fame), and many others; there are few, if any, purchased insects in the whole cabinet. A fine English *Antiopa* first strikes the eye, the

Doplidice are marked F., indeed, in all instances where a foreign type has been included, such as *Nerii*, *Fraxini*, a label is attached "bred from foreign eggs," "continental," &c. This is as it should be, and we cannot help thinking that if the same was done in other large collection it would have been better. I cannot but agree with your remarks last month that the collection ought to belong to some public society, and I certainly think our leaders should make some effort to obtain for public use the actual insects bred from the larvæ now being figured. But to prevent my remarks being too long I refrain from further preface.

The Diurni include bred specimens of 58 of our British butterflies, a very unusual number, but Mr. Buckler frequently received eggs or larvæ for the purpose of figuring, and he always most carefully reared those insects entrusted to his care—where he failed, the Rev. John Hellins was often enabled to fill the gap. The Swallow-tail (*P. Machaon*) is represented by nine specimens, bred from larvæ taken near Cambridge, received from Mr. Doubleday; others reared from the eggs supplied him by Mr. C. G. Barrett, locality Horning Fen, Norfolk; one lot of larva were full fed August 1st to 15th, the others on June 21st, 1871. *Sinapis* one, reared from a larva sent by Rev. J. Hellins, figured on September 5th and 15th, full-fed September 22nd and emerged May 21st following; others taken on the wing by Mr. Buckler, in Bolney Wood, Sussex. *Cratagi* very fine, eight taken on the wing at Lumley, Sussex; two bred from larva and pupa found also at Lumley; a nest of larvæ taken after hibernation in Newport, Mon., full-fed May 25th. *Brassicæ*, *rapæ*, and *napi*, all bred freely by Mr. Buckler, from larvæ found in his garden, and at Prinsted, and other localities in the neighbourhood. *Cardamines* nine males and six females taken in Sussex lanes; one male and two females bred from larvæ of which figures are given. *Rhamni*, taken and bred, larvæ from buckthorn, in various Sussex and Hampshire localities. *Edusa* seven males and seven females taken on railway banks and fields; a female laid eggs on Dutch clover from June 12th to June 18th, from which others were bred August 6th to the 20th; var. *Helice* include a very fine series, some were taken at Portsdown and Markham in clover fields. *C. Hyale*, mostly taken on the wing by Mr. Buckler and Mr. James Terry, some from Gloucester and Colchester. *A. Paphia*, common at Wesbourne; one bred from egg found on moss where a female had settled, full-fed May 18th, emerged June 30th, 1862. *Aglaia*, bred from larvæ on dog violet, full-fed June 29th, emerged August 7th; nine males and two females from Sussex and Gloucestershire. *Adippe*, taken freely at Long Coppice, near Emsworth; a larva found on dog violet by Rev. Hallett Todd, was full-fed June 29th, but unfortunately died. *Euphrosyne* from Westbourne Common; others bred

from Dartmouth larvæ; one larva found hybernating under primrose leaf, sent by Mr. W. Harwood, full-fed April 27th, came out May 23rd. The other Pearl Bordered Fritillary (*Selene*) was equally well distributed in the same district, Westbourne, Stoughton Down, and at Hayward's Heath; a female taken in cop. laid eggs on June 9th of the following year; one larva found in June (figured) was full grown July 30th. *Artemis*, Mr. Buckler took a whole series, 192 larvæ on *Scabiosa succisa* at Warblington; in other localities in Hampshire the same insect is found extremely plentiful. *Cinxia* were bred, a beautiful lot, from the usual Sandown and Bembridge cliff locality. *Athalia* larvæ were sent by Mr. Newman, and from Colchester (W. H. Harwood), fed up May 21st, and emerged June 27th and 30th; the remainder of series being perfect insects from various friends. *V. c-album*, from Rotherham, several bred from larvæ September 9th to 19th, found on currant bushes in gardens, also on hop, came from Mrs. Hutchinson, of Leominster; fed up August 23rd, the beautiful larvæ are figured in the Ray Society's recent volume, plate ix. *Urticæ*, from Hampshire and Sussex, a plentiful species. *Polychloros* were taken in the garden at Lumley Cottage, feeding on elm, also from Exeter; full-fed June 24th and June 19th, emerged July 21st and 17th respectively. *Antiopa*, a British example, was purchased by Mr. Buckler, almost the only insect I can find this remark refers to.

(To be continued.)

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 3, 1886.—R. M'LACHLAN, F.R.S., President, in the chair.

Mr. J. M. C. Johnson was elected a Fellow, and Cavaliere Piero Bargagli, of Florence, formerly Secretary of the Entomological Society of Italy, was elected a Foreign Member.

Mr. Pascoe exhibited a curious larva, probably of a *Papilio*, from Parà; and a pupa-case of *Anosia Plexippus* (*Danaïs Archippus*), from the same locality.

Mr. W. J. Williams exhibited, on behalf of Mr. C. Bartlett, a gigantic hairy and spiny larva, perhaps allied to *Gastropacha*; from Madagascar.

Mr. C. O. Waterhouse exhibited *Rutela rufipennis*, *Doryphora Haroldi* and some other undescribed species of Coleoptera from Colombia.

Mr. Billups exhibited a specimen of *Cholus Forbesii*, found alive in a horticultural sale-room in London.

Mr. Eland Shaw referred to the exhibition, at the last meeting, of *Tettix australis* from New South Wales, and called attention to the fact that the aquatic habits of certain species of the genus *Tettix* in India had been previously recorded by Leopold Fischer.

Dr. Fritz Müller communicated a paper on Fig Insects from the neighbourhood of the River Itajahi, South America; and Prof. Meldola exhibited, on behalf of Dr. Fritz Müller, a number of specimens of the insects described in the paper.

Mr. E. B. Poulton, M.A., F.Z.S., read "Further Notes upon Lepidopterous Larvæ and Pupæ, including an account of the loss of weight in the freshly-formed pupa." The paper included notes upon points in the ontogeny of *Smerinthus* larvæ, and a description and figure of the bifid and hairy caudal horn in the newly-hatched *Smerinthus populi*. The adult larva of *Acherontia atropos* was compared with that of *Sphinx ligustri*, and the as yet unknown appearance of the former in earlier stages was predicted. Hitherto unnoticed eye-like marks were pointed out in the terrifying attitude of *Cherocampa elpenor*, and the terrifying of *Dicranura vinula* was described, and the defensive fluid of this species was shown to be strong formic acid. An eversible gland was described in *Orgyia pudibunda*, and the protection of *Acronycta leporina* was explained by its resemblance to a cocoon and the darkening of its hairs when full-fed. A valvular aperture in the cocoons of *Chloephora prasinana*, &c., was described, enabling the imagos to emerge. There were also notes upon *Paniscus cephalotes* parasitic on the larva of *D. vinula*, and tables showing the immense loss of weight in newly-exposed lepidopterous pupæ due to evaporation from the moist skin. Mr. Poulton also exhibited larvæ of *Paniscus cephalotes*. A discussion followed the reading of this paper, in which Messrs. Kirby, White, Slater, and Poulton took part.—H. Goss, Hon. Secretary.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

This Society, which dates from 1872, presents us with a report of 50 pages, from which we gather the following. It now numbers 55 members, an increase of three during the year. It has a library, a collection of insects, and a herbarium, to the two former of which considerable additions have been made in 1885. Five excursions have been held; an exhibition on 3rd Dec., which was a great success; exhibitions have also been made at the regular meetings, among which we notice some very interesting species. The balance sheet is very satisfactory, shewing £10 9s. 5d. in hand, against £3 12. 10d. last year. The President (R. South, Esq.) gave a lengthy and interesting address at the annual meeting, and urged upon the members the desirability

of collecting "material for the formation of the insect Fauna" of the district. He gave a brief account of the discoveries of the past year in Entomological Science, including among the addition to British Fauna *Cucullia artemisiae*, rather to our surprise. He also appears to believe in the Devonshire captures of *Hera*, and cites the specimens taken by Mr. D'Orville and Capt. Russell, of which we have already spoken. A brief account of those naturalists who have died during the year concludes a very complete *resume* of the year's work. The report also contains "Some observations on Protective Coloration of Lepidoptera," to which we may perhaps refer on a future occasion. The South London Society is the only one we have met with that has adopted the German nomenclature, but it very wisely translates the names into those in ordinary use as the "Entomologist" does.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The very severe weather, and consequent scarcity of insects, during the past month, have acted injuriously on the meetings of the Society. On 4th March the annual distribution of surplus specimens took place, and over a thousand specimens of lepidoptera and coleoptera were distributed among the members present. At the same meeting, Mr. May exhibited a very large and curious coleopterous larva found in a bale of Gambier, and also pupa of the same species. Very few records of captures have been made up to date. *H. leucophearia* appears to be about sparingly and also *P. pilosaria*, *H. rupicapraria* was noted in good condition on the 13th inst., while *H. progemmaria* apparently has not yet put in an appearance.—ERNEST ANDERSON, Secy.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The ninth annual meeting of this Society was held in the Free Library, Liverpool, Mr. S. T. Capper, F.L.S. in the chair, who gave an interesting *resume* of the year's proceedings. The Society commenced with only 11 members, and now numbers 54. Monthly meetings are held, at which papers are read, followed by discussion. The more interesting of these have been published in the various magazines, several appearing in our own pages. At one of their meetings Dr. Ellis delivered an interesting lecture on "Grotesque insects," illustrated by examples; at another Mr. Mosley exhibited a number of cases illustrative of the attacks of insects on farm and garden crops. The Society is now compiling lists of the Lepidopterous and Coleopterous Fauna, under the editorship of our friend Dr. Ellis. The Library is much used and is being continually added to. Mr. Capper laments the death of several friends during the previous year, particularly of the late Joseph Sidebotham and the late Nicholas Cooke, and quotes largely from our biographical sketch of Mr. Cooke. Arrangements have been made with the Liverpool authorities

to whom Mr. Cooke bequeathed his magnificent collection, that a few drawers from it shall be placed on the table at the monthly gatherings of the Society, which, we have no doubt, will add largely to the interest of the meetings.

DERBY NATURALISTS' SOCIETY.

This Society held their first exhibition of Natural History objects on 5th and 6th March, at St. Andrew's School, by the kind permission of Mr. G. Sutherland, F.R.G.S., Vice-President. Among the exhibitors Mr. J. Hill shewed fine specimens of *S. ocellatus*; preserved larvæ of *A. atropos* and *Ligniperda*, with the perfect insect; fine varieties of *Caja*; bred specimens of *Apicaria*; black varieties of *Betularia*; *papilionaria* captured at Little Eaton; varieties of *grossulariata*, *binudularia* from the usual type to black; dark variety of *Polyodon*; and a fine series of *T. cosmorphorana*, *Rubiginosana*, *Cinnamoneana*, *Picana*, *Ulmana*, *Mediana*, *Udmanniana*, *Ophthalmicana*; hymenoptera and coleoptera; preserved larvæ; land and freshwater shells, and a fine collection of coins. Mr. Hey exhibited lepidoptera and a collection of land and fresh-water shells; very neatly arranged photos and fossils. Mr. Nixon, lepidoptera, amongst which was *A. atropos* captured last season, and a fine bred specimen of *A. alni*; hymenoptera, diptera, and a collection of marine shells and fossils. Mr. Pullen—lepidoptera, coleoptera, hymenoptera and diptera; a collection of marine shells, amongst which were specimens of *Conus princeps*, *C. augur*, *C. nobilis*, and *Scalaria pretiosa*. Mr. Walton coleoptera, and a collection of minerals. Mr. Freckleton a collection of coleoptera. Mr. Hutchinson a fine pair of otters, shot near Derby; a pure white variety of the robin; a fine buff variety of the common house sparrow; and a nice collection of British birds' eggs. Altogether, the collections formed a very attractive and interesting exhibition.

NOTES AND OBSERVATIONS.

NEWTS.—I read with much interest Mr. Warner's article on "Frogs," in which he gives as a personal proof of so-called showers of frogs, an instance of the smooth newt being found in a pan of fresh rain water, and substantiates it by remarking that, as far as he knows, newts cannot climb perpendicularly—with this I differ. Some years ago I collected 2 or 3 dozen of these newts and placed them in one of the upright glass aquaria, about half-full of water, in my bedroom, next day I noticed that their number had greatly diminished, and on searching found them among my bedclothes, under the carpet, and in all sorts of crannies where they could hide. Now although I did not actually see them climb up the glass side, they must have done so, or how else could

they have made their escape. While on the subject of newts, I once noticed a most interesting struggle which took place in my aquarium, which I give from a note made on the spot while watching them. I had obtained some small worms, and was giving my little four-footed friends a feed, and had put in one worm which was rather larger than the others, when it was immediately seized at either end by two newts and each began devouring its prey, giving the usual peculiar shake and wriggle; this continued until the two newts got within half-an-inch of each other. I was now fully interested and wondered if either would give in, however, they preferred to struggle, and continued to jerk in the worm, and in a few more moments the two combatants were mouth to mouth. The interest was now intense, each tried in turn to obtain the rest of the worm from his adversary, and thus jerking each other round and round the tank. But this state of things could not last for ever, and soon the unfortunate worm settled the dispute itself by dividing in two, when each newt sank to the bottom with its hard earned meat to rest, much exhausted by its recent exertions, but apparently satisfied.—F. N. PIERCE, Liverpool.

CAPTURES AT LEWISHAM DURING 1885.—The following are among the insects captured by me this season:—At Light: *N. festiva*, *T. derasa*, *M. albicillata*, *P. syringaria*, *M. margaritaria*, *Z. æscubi*, *L. conigera*, *Y. elutata*, *M. rivata*, *D. cucubali*, *X. ferruginea*, *G. flavago*, *O. dilutata*, *E. cervinaria*, *N. camelina*, *S. dubitata*. At Sugar: *L. comna*, *X. hepatica*, *R. tenebrosa*, *N. augur*, *C. ligniperda*, *C. trapezina*, *A. pyramidea*, *C. nupta*, *N. C-nigrum*, *A. puta*, *C. diffinis*, *A. pistacina*, *A. lunosa*, *X. citrigo*, *A. suffusa*, *M. oxyacanthæ*. On Fences and Tree Trunks: *A. bissitata*, *A. nebulosa*, *X. lithoxylea*, *A. tincta*, *H. serena*, *H. pennaria*, *T. punctulata*. Flying in the Sunshine: *S. tipuliformis*, *F. piniaria*. At Ivy: *O. lota*. While staying in Dorsetshire, I made a trip to Brockenhurst, and in two hours caught the following: *G. rhamnii*, *S. semele*, *A. Paphia*, *A. Aglaia*, *P. ægeria*, *E. hyperanthus*, *L. ægon*, *E. palumbaria*, *A. strigillaria*, and *P. ænea*.—T. F. MARRIOTT, 11, George Lane, Lewisham, Kent.

CHEMATOBIA BRUMATA: On referring to the "Haggerston Entomological Society's" report, in the last number of the Y.N. (page 54,) I see that January 30th, is considered a late and exceptional date to find *C. brumata*. I may say that, here in the North, I have on several occasions found it quite common and in good condition about that time. On looking through my diary, I find that February 17th, 1878, is the latest date on which I have noticed this species on the wing.—J. W. CARTER, Bradford.

S. HYPERANTHUS.—I took a specimen of this butterfly on July 26, 1885, without either the rings or white spots on the underside of the fore-wings,

and with only four faint white spots, and no rings round them on the hind-wings. Is this a common variety, as I took one almost similar a few years ago.—E. HUTCHINSON, Kimbolton, Leominster.

(This is the var. *Arete*, Mull. It is not uncommon in some places, Dover for instance, but is not generally common.—Ed. Y.N.)

SATURDAY, MARCH 13th.—Observed *leucophearia* and *fagella* on Oaks, at Richmond Park; hard frost, skating on the ponds; picked up a dead thrush, absolutely starved to death, it had tried to get water from a frozen spring on Wimbledon Common; wrens were searching round the tree trunks for insects, all birds very tame.—J. HENDERSON, Herne Hill.

MARCH 14th.—Single specimens of *æscularia*, *P. pilosaria*, *leucophearia*, on fences. March 20th: in Surrey Woods, warm weather brought moths out, 7 *leucophearia*, 3 *progemmaria* males, and one female laid 50 eggs, 3 *æscularia*, 7 *leucophearia*, *Tortrix hyemana* abundant.—C. H. WATSON.

PRESERVATION OF COLOURS IN DRAGONFLIES.—Can any of the readers of the *Young Naturalist* give me a recipe for preserving the brilliant colours in dragonflies? I captured a large number of beautiful specimens in Argyleshire last season, but find that they have since lost much of their beauty. As I intend being in the same locality again this season, and hope to take some more specimens, I shall be glad of any information as to how I could preserve their brilliant colours.—JOHN MACKAY, Glasgow.

MR. BUCKLER'S DRAWINGS AND THE RAY SOCIETY'S NEW VOLUME.

The Rev. J. Hellins, The Close, Exeter, being anxious to complete as far as possible the descriptions of larvæ of British Macro-lepidoptera, which the late Mr. Buckler, owing to the suddenness of his death, left unfinished, would be thankful to any entomologist, who would kindly furnish him with an example or two of the larvæ of any of the following species:—*Atropos*, *Celerio*, *Elpenor*, *Porcellus*, *Stellatarum*, *Fuciformis*, *Bombyliformis*, *Statice*, *Geryon*, *Z. trifolii*, *Cribrum*, *P. arundinis*, *Testudo*, *Ilicifolia*, *Dictæoides*, *Dodonea*. Should the perfect insect be bred, Mr. Hellins does not wish to retain them.

TO CORRESPONDENTS.

R.B.—It is you who are wrong. True, Doubleday gives priority to Guenee's name of *Molybdeola*, and the error arose thus. Guenee named it on the 14th August, 1861, and as it was called *Sevicea* in the *Entomologists' Annual* for 1862, it would seem at first sight that Guenee's name had priority, but Gregson described and named the species in the *Entomologists' Weekly Intelligencer*, on the 27th October, 1860.

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NATURALISTS' DIARY IN NORTH DEVON AND SOMERSET.

BY

MISS PRESCOTT-DECIE

AND

MISS N. PRESCOTT-DECIE.

APRIL 29.—On the afternoon of this day we arrived at Westward Ho, Bideford, North Devon. Towards evening we* went for a walk, and heard a Grasshopper Warbler in the gorse, which grows thickly along the side of the hill above Westward Ho. Westward Ho itself is a curious place, and one hardly knows by what word to describe it. It is not a “watering place,” for its *raison d'être* is not water, but golf; and it can hardly be termed a village, for it is too scattered. It consists of a few lodging-houses (much frequented by golfers), two or three shops, a hotel, the United Service and Kingsley Colleges, a few private residences, and a little row of cottages where some coastguards and fishermen live. Most of these houses are scattered about the face of a steepish hill, looking north-west over Bideford Bay, whilst the remainder lie on the lower ground, between the foot of the hill and the sea. The surrounding country offers many attractions to the naturalist. On the north side lie the Northam Burrows and a very long stretch of sandy beach. Down the coast to the southward are cliffs and rocks, while just over the hill, at the back of the houses, the country is as warm and sheltered as if the sea were miles distant. The Northam Burrows, on which are the golf links, consist of flats and mud, about two miles in extent. Some parts of these flats are covered with fine turf, others grow nothing but coarse grass and rushes, whilst others again have no vegetation but are strewn with loose pebbles. On the side, towards the sea, is a line of small sand hills, among which is the house in which the Appledore life-boat is kept. The Burrows

NOTE.—“We,” meaning here and throughout the article, the writers and two of their brothers.

are divided from the beach by what is locally known as the "Pebble Ridge," a bank composed of stones, varying greatly in size, some being no bigger than a pigeon's egg, and some large enough to tax the strength of two or three men to move them, but all alike much worn by the action of the sea, and belonging to the same geological formation, a formation totally different to any in the neighbourhood, but similar to that on the North-west coast of Cornwall, from which indeed these stones are said to have been brought by the current. It is a curious fact that, though the shore on one side of Westward Ho, as far as Hartland Point, is strewn with these pebbles, there is not one to be found on the northern shore of Bideford Bay, or higher up the coast. In high spring tides, or during very stormy weather, the sea dashes over the "Pebble Ridge," and floods the Burrows. On the farther side of the Burrows is a muddy flat, which is always covered by the sea at high water, and this when it is left dry at low water, forms a feeding ground for various kinds of birds.

APRIL 30.—In the morning we took a good many Diptera, chiefly *Bibio marci* and *Johannis*, flying about some primroses, in a warm sunny corner at the top of the cliff. In the afternoon we went down to the Burrows, where we dug a Wheatear's nest out of a rabbit-hole in a sand bank. The nest, which was made of dry grass and a few sticks, and lined with wool, hair, and two or three feathers, was placed a long way down the hole and contained two eggs of a light blue colour. Wheatears are very numerous, but as parts of the burrows are full of rabbit holes, it is almost hopeless to look for their nests, and this was the only one we were lucky enough to find. We took a specimen of *Hylemyia variata* and a few other species of Diptera flying about the sand, and saw some Green Cormorants and Herring Gulls feeding on the shore; also a flock of Ringed Dotterel.

MAY 2.—We took flying about the roadsides and hedgebanks at the top of the cliff, one *Hydrotaca sylvicola*, one *Calliphora erythrocephala*, and several other species of Diptera. *C. erythrocephala* occurred plentifully and had we cared to do so, we might have captured this insect in dozens. Several species of the genus *Bibio* were also extremely common, the very long and much broadened hind legs of these flies gives them a peculiar appearance when flying and makes them rather conspicuous. We found larvæ of *L. didymata* plentiful among the primroses which grow luxuriantly on every bank, and even in sheltered places on the cliffs themselves.

MAY 4.—We walked to Appledore in the morning and from there rowed across Bideford Bay, and spent the day collecting on the Braunton Burrows. These are quite different to the Northam Burrows, and are merely a long stretch of bare sand hills, thinly overgrown in places with bent grass, and

rushes. We however, found some common Hounds' Tongue, Great Mullein, a Spurge, one of the smaller Crane's Bills and a few other plants, the names of which we did not know. The sand in places was perforated with a number of little round holes, in each of which a spider was concealed, evidently waiting for any unwary insect, that might fall into the trap. Ants and beetles of various kinds were common, and we captured specimens of the following species of Diptera, as well as a good many others we have not yet been able to identify, *Spilogaster quadrum*, *Spilogaster duplicata*, *Aricia perditia*, *Calliphora erythrocephala* and *Dilophus vulgaris*. It was unfortunately a cold and rather dull day, or probably our captures would have been more numerous. We saw no butterflies or moths all day, and the only larvæ we took were six *O. potatoia*, on the rushes and bent grass, three *C. caya*, on Hounds' Tongue and a few larvæ of some *Noctua* on the sand among the rough grass. We were not successful in rearing these last mentioned larvæ, and so never ascertained to what species they belonged. Wheatears were the only birds that were at all plentiful, but, there were also a few Skylarks. We found a nest, belonging to a pair of these latter birds, under a tuft of rushes, and in the middle of another tuft, a Linnet's nest, each with three eggs. There were quantities of rabbits and we dug up several holes in the vain hope of finding a Wheatear's nest.

MAY 6.—We went down in the morning to Northam Burrows, and took a few Diptera flying over the sand and rushes. Whilst we were engaged in capturing them, two large ducks flew over the Burrows and went down to the sea in which we watched them swimming for a few minutes, they looked very black and white as they flew over us, but we were too far off to distinguish their colours at all clearly and could not tell what kind they were.

MAY 7.—We went over the hill at the back of Westward Ho, and spent the day collecting in the lanes, larvæ of *O. potatoia* and *B. quercus*, were fairly common in the hedge banks, and our captures of flies were very numerous, although the day was cold, it was sunny and warm out of the wind. Most of the Diptera we took were either settled on, or flying over, the flowers of an umbelliferous plant which smelt extremely disagreeable; this of course being an attraction to them: *Smyrnum olusatrum* (Common Alexanders) we think the plant was, but we could not be quite sure, as we were not able to bring any home to identify and had no book with us. Whatever the plant may have been, it was very common in the hedges and along the sides of the lanes. The following is a list of the species of Diptera taken, *Sarcophaga vagans*, *Sarcophaga carnaria*, *Scatophaga stercoraria*, *Platycheirus manicatus*, *Syrphus vitripennis*, *Melanostoma scalaris*, *Rhingia rostrata*, *Platypterus peltatus*, *Dilophus vulgaris*, *Hylemyia strigosa*, *Hylemyia variata*, *Hylemyia*

nigrimana, *Myospila mediatubunda*, *Spilogaster duplicata*, *Calliphora erythrocephala*.

MAY 8.—We went collecting inland again and took amongst others the following Diptera: *Gymnochaeta viridus*, *Musca hortorum*, *Scatophaga stercoraria*, *Hylemyia strigosa*, *Hylemyia variata*, *Anthomyia pluvialis*, *Nemopoda cylindrica* and *Empis trigramma*. We found the larvæ of *B. quercus* and one *C. caja* in the hedge bank, and took one imago of *P. ægeria*. In the evening we tried "sugaring" and met with the success to which we are accustomed. The following note is entered in our sugaring records (in we fear not very good English.) "The wind was rather cold, but in sheltered places, where we sugared as much as we could, it was warm enough. It was a clear night, but not very light as the moon was not nearly full. We sugared in about fifteen places, mostly gate posts and trunks of trees, but did not even see a single moth."

MAY 11.—We took a number of Diptera flying over the sand and rushes on the Burrows. The following species were amongst our captures; *Dilophus vulgaris*, *Sarcophaga pumilla*, *Spilogaster quadrum*, *Gonia capitata*, *G. trifaria*, *Lucilia cæsareæ*, *Spilogaster duplicata*. Besides these we took a specimen of *P. megera*. This and the *Ægeria* taken the day before, were almost the only butterflies we had seen, with the exception of a few *P. rapæ*.

MAY 12.—In the morning we went prawning and saw on the rocks, some Curlews and two Oystercatchers. The fishermen told us it was too early in the year, to find many prawns in these pools, but that later in the summer there were quantities to be caught. While the weather is cold, the prawns stay in the deeper water. On our way back along the top of the cliffs we found in the grass near the path, a Skylark's nest with four eggs. In the afternoon we went down to the Burrows and on the far side, when the tide was nearly high, by taking advantage of the shelter afforded by a friendly hill, we got very close to a number of Curlews on the shore, without disturbing them. On this occasion there were also a Knot feeding with them. This bird is much smaller than a Curlew, with shorter legs and a short straight bill, brown on the back and with a reddish breast and long wings. Large flocks of Ringed-dotterel were also to be seen on the shore. We spent some time on this, and several other days, searching for the eggs of these pretty little birds, but without success, though this, according to the Rev. F. O. Morris, is the time at which they breed. If it be the case, as R. Mudie suggests, that these birds only sit on their eggs during the night and in cold dull weather, leaving them at other times to be hatched by the power of the sun, this would of course add to the difficulty of finding them, as there would be little chance of putting the bird off the nest. A large Duck flew over our heads, while we

were watching the Curlews, probably of the same kind as the pair we saw on the 6th. We took one *M. subtristata* on the Burrows, and in the evening one *T. stabilis*, which flew in through the open windows, to the light.

MAY 13.—We went out in a sailing boat in the morning, and saw four Razorbills swimming and diving in the sea. A Green Cormorant, or Shag, as the boatman called it, also flew close past us. In the afternoon we went collecting inland, but the day being cold and dull, our captures of Diptera were by no means numerous. All those we took, (amongst which were the following species; *Hilara maura*, *Platyheirus manicatus*, *Musca hortorum*, *Hylemyia strigosa* and *Hylemyia variata*,) were sitting among the plants in the hedge banks, in a semi-torpid condition. We beat some larvæ out of the hedges into an inverted umbrella, but besides the always common *C. brumata*, we only took one *A. grossulariata*, one *L. complanula*, one *H. thymiaria*, and two or three more, which we did not know.

MAY 14.—We went prawning for about two hours in the morning and spent the rest of the day sailing. This and the one day mentioned before, were the only two occasions on which we had any boating. There is no landing place at Westward Ho, and the coast is so dangerous, that few of the Appledore fishermen will venture, even in the finest weather, to bring their boats to the rocks, to pick up any one wishing to go for a sail. Bideford Bar, over which we sailed, consists of two ridges of sand, the "North Tail" and the "South Tail," which are formed where the current of the sea meets that of the rivers Taw and Torridge, and runs straight out to sea for some little distance. The Bar is partially uncovered at low tide, but at high water only the long line of breakers shows where it lies. We saw Razorbills swimming in the sea and some Green Cormorants on the shore. Just inside the Bar, at the mouth of the rivers, the fishermen were very busy salmon-netting, but the season having only just begun, fish were very scarce and not more than one had been caught that morning, in spite of the quantities of nets stretched across the entrance to the harbour. We sailed on past the little fishing village of Appledore, as far as Bideford, and then rowed up the Torridge to Wear Gifford, beyond which the river becomes too shallow for boating. A good many Curlews were feeding on the muddy banks of the river.

MAY 15.—We went to the far side of the Burrows to look once more for the nests of the Ring-dotterel, but again failed to find any. A small flock of Dunlin were running about on the pebbles, close to the edge of the waves, and as they were not at all shy, we managed to get within ten or fifteen yards of them, and were able to see their colour and markings quite distinctly. The Dunlin is a small and rather plump bird, with a longish bill and moder-

ately long legs. The colour of the back and wings is reddish-brown, very prettily mottled. The throat and breast are grey, speckled with brown, whilst below this is a strongly marked dark patch. Diptera were scarce, but we took two or three specimens flying about the sand and rushes.

MAY 16.—We walked about two miles along the top of the cliff, and then went down to the shore, where we spent the whole day prawning. The pools here are more overgrown with seaweed than those in the rocks near to Westward Ho, and perhaps for this reason there are usually more prawns in them. Most of those we caught on this occasion were, however, very small. We saw two or three flocks of Oyster Catchers on the rocks during the day and some Curlews.

MAY 18.—Spent the day prawning. While we were thus occupied, a Guillemot was washed up on the rocks near us. It was not quite dead when we picked it up, but was evidently dying, and only survived a few minutes; its plumage was very good, and it bore no external marks of injury. Perhaps some little description of the rocks, on which we spent so much of our time, would not be out of place here. They appear to be of a slaty formation, and as the strata of which they are composed are perpendicular, instead of horizontal as in ordinary cases, they are extremely rough, jagged, and irregular. Moreover, as the lines of the strata run at right angles to the coast line, the action of the sea has worn in them a great number of deep gullies, up which the water rises very quickly, when the tide is coming in. And inasmuch as these gullies are not always straight, but occasionally intersect one another, some care is necessary on the part of any one who objects to being cut off by the tide. There is a large extent of rock left exposed at low tide, in which are numberless pools, full of seaweed, anemones, and shellfish. Blennies also are very common in them. There seemed to be several species of sea-anemones, but knowing nothing about them, the only one we have since been able to identify is the common *Actinia mesembryanthemum*. A yellow kind is also very plentiful, which so closely resembles one of the common seaweeds, both in colour and manner of growth, as to make it difficult to distinguish between them. This resemblance is no doubt of use to the anemone in two ways, as besides serving to conceal them from their enemies, it also helps to attract their prey. A large red anemone, not so common as those just mentioned, makes use of another device for concealment, that of covering itself outside with small pieces of broken shells and grains of sand. Besides these we found a green anemone, and a species striped outside with red and green, but this last seemed rare.

MAY 19.—Very wet, but in spite of the rain we were out on the rocks

prawning, most of the day. We did not, however, see or take anything of especial interest.

MAY 20.—On this day we left Westward Ho, and going by rail as far as Barnstaple, drove on from there to Lynton, a distance of about 17 miles. The road took us at first through lovely wooded valleys, then up and down hills, steep even for Devonshire, and finally for the last mile or two over the outskirts of Exmoor. The little town of Lynton consists, as so many towns along the English and Welsh coasts do, of a recent growth of hotels and lodging-houses, grafted upon a picturesque village, apparently many hundreds of years old. The original village, which seems here to have been very small, nestled in a hollow lying a little way back from the top of a very high cliff. Along the very edge of this cliff some of the modern houses have been built, and the rest are placed on the side of the steep hill, which rises on the inland side of the old village. At the foot of the cliff, and beside the mouth of the little Lyn, lies the village of Lynmouth. Soon after our arrival at Lynton, we walked as far as the "Valley of Rocks," the following description of which, from "Lorna Doone," though probably familiar to most readers of the Y.N., seems worthy to be quoted at length:—"This valley, or 'goyal,' as we term it, being small for a valley, lies to the west of Lynton, about a mile from the town perhaps, and away towards Ley Manor. Our homefolk always call it the 'Danes,' or the 'Denes'; which is no more they tell me, than a hollow place, even as the word 'den' is.....It is a green, rough-sided hollow, bending at the middle, touched with stone at either crest, and dotted here and there with slabs in and out the brambles. On the right hand is an upward crag, called by some the 'Castle,' easy enough to scale, and giving a great view of the channel. Facing this from the inland side and the elbow of the valley, a queer old pile of rock arises, bold behind one another, and quite enough to affright a man, if it only were ten times larger. This is called the 'Devil's Cheese-ring,' or the 'Devil's Cheese-knife,' which mean the same thing, as our fathers were used to eat their cheese from a scoop." We saw here a number of Stonechats and a pair of Ravens, which latter birds probably had a nest somewhere in the "Castle Rock." Towards evening, on the way back, we heard several Corn Crakes in some fields just outside the town.

MAY 21. We walked some distance up the valley of the East Lyn. This rocky stream, which runs down from the famous "Doone Valley," flows in a deep gorge, with very high hills rising on each side. In places, these hills, cliffs they might almost be called, are thickly wooded, whilst in others they are covered only with scattered rocks and patches of bright yellow gorse, and look very wild and rugged. Numbers of Dippers and Yellow Wagtails were

flying up and down the stream, taking very little notice of the few fishers and passers-by. Quantities of trout are caught here, though almost all are very small, few weighing more than a quarter-of-a-pound. We took a good specimen of *V. maculata*, and a great number of Diptera. Most of the latter were taken on the flowers of a Spurge, we believe to have been *Euphorbia pilosa*, which was growing freely along the edge of the water. The following species were among those taken: *Hylemyia strigosa*, *Lucilia cornicina*, *Dryomyza flaveola*, *Scatophaga stercoraria*, *Melanostoma scalaris*, *Hilara maura*, *Beris chalybeata*, *Platypterus pellatus*, *Bibio venosus* and *Lasiops apicalis*

MAY 22.—We walked about six miles down the coast, towards Ilfracombe. It was rather a cold, stormy day, and though bright and sunny at times, but few insects were to be seen. We beat a few larvæ, principally *C. elinguarua* and *L. didymata*, from the honeysuckle and heather, which were growing on the banks at the roadside. We did not know before this, that larvæ of *L. didymata*, would live on honeysuckle. As we were returning through the "Valley of Rocks," we saw a Buzzard, a treat we had not had since our last visit to Devonshire, six years ago. After sailing round our heads once or twice, the bird disappeared into the cliffs, in which probably was its nest. We saw the Ravens again on the "Castle Rock."

MAY 23.—Leaving Lynnton with regret, we drove another 17 miles or so, up the coast to Minehead, where we spent three days before returning home. A short distance beyond Lynmouth we again saw a Buzzard. As far as the village of Parlock, the road lies over Exmoor, and is most of the way within sight of the sea. The cliffs, which are very steep and rugged along this part of the coast, are broken here and there by deep valleys, or "combs," as they are called in Devonshire, running from the moor down to the sea. Beyond Parlock, which is in Somersetshire, the country is of quite a different character and though very pretty, the scenery is not to be compared with that nearer Lynnton. The road lies further inland, and instead of being over a heathy moor, passes by cultivated fields, orchards and woods. The town of Minehead appears to have been built at three distinct periods. The old, or "Upper Town" as it is called, seem to have been a fishing village, and is merely a number of picturesque old white-washed cottages. Below this is the "Middle Town," built at a more recent date, but consisting, like the other, of fishermen's houses. Whilst on the flat ground by the sea, lies the "Lower Town," which has been built comparatively lately and being composed almost entirely of modern lodging houses and hotels, is not at all picturesque or pretty. On one side of the town is a flat expanse of mud, grown over with grass, where are the Golf-links. These, however, are not very good and in consequence, are but little used. The beach, which is very flat, is composed in part of

mud as well as sand, and for this reason the sea, instead of being the beautiful clear blue of the more open channel, is of a thick brownish colour.

MAY 24.—In the afternoon we walked a short distance inland and found a Chiff-chaff's nest with several eggs, in the grassy bank of a lane. We saw several *L. argiolus* flying in the sunshine, but having no net with us, could not catch any. Though a bright sunny afternoon, a bat was flying backwards and forwards under the shade of some trees, busily engaged in a hunt for insects. We were interested and a little disgusted to see a couple of dozen or more dead adders, all of which were said to have been killed the day before, hung up outside a farm house, which we passed in the course of our walk.

MAY 25.—Very wet in the morning, but cleared a little later in the day, when we went by train to Blue Anchor, in order to see the alabaster cliffs, which are within half-a-mile of that station. These cliffs are composed entirely of a blue slaty stone, intersected by layers of white and red alabaster, the whole forming a most beautiful coloured rock. After collecting some good specimens of both colours, we walked back to Minehead, passing on our way, through the quaint old village of Dunster.

MAY 26.—We went to the top of Dunkerry Beacon, the highest point of Exmoor. This hill, about five miles from Minehead, rises to a height of some 1660 feet above the sea, and in ancient times, beacon fires were lighted on its summit, to give warning of the approach of an enemy; these being answered, it is said, by similar signals on the Welsh and even on the far distant Malvern Hills. We were unfortunate with regard to the weather, the day being stormy and the clouds very low, at one time hanging right below us over the sea, and though indeed nothing could have been more beautiful, still there was no distant view; the Welsh coast being indistinct and the Malvern Hills quite invisible. Numerous *S. carpini* were flying over the heather, and we took some very dark varieties, all however, were more or less worn. We took, besides these, some specimens of *F. atomaria* and beat a larvæ out of the heather by the roadside. A Grouse was seen by one of the party. The following day we returned home, taking with us all the various treasures we had collected, during the very pleasant month we had spent in the counties of Devon and Somerset.

ENTHUSIASTIC ENTOMOLOGISTS.

By JOHN MACKAY.

Perhaps there is no feature more characteristic of the true entomologist than that of enthusiasm. It may indeed be truly said that the student of

nature, who does not possess a good share of this excellent quality, is one not likely to achieve any great success in his special branch of study, be it entomology or any other subject; he is not a naturalist in the true sense of the word, for he is deficient in that quality which is essential to a true student of nature—a passionate love for nature. Why, it is this enthusiasm or thorough earnestness in his work that spurs on the diligent worker to further exertion, without which great results cannot be attained. Those of you who have read the lives of such eminent men as Thomas Edwards, Hugh Miller, and others who have achieved fame within recent years, will know that the great cause of their success was that intense love for their study which urged them on to further investigation, and which ultimately crowned their labours with success. Take the late Mr. Buckler as another example. Is it possible that, “for more than a quarter of a century before his death,” this entomologist would have persevered in his difficult work of describing and figuring the the larvæ of the British Lepidoptera, unless his whole heart was absorbed in in the great work in which he was engaged? I think not. Without a genuine love for the study I do not think he would have continued this patient work through so many years.

Enthusiasm, then, may be justly termed as one of principal characteristics of the entomologist. It is this intense love which prompts the entomologist to walk mile after mile, o’er hill and moor, in the chance hope (too often vain) of taking a few specimens of yon insignificant little fly; to stay for hours in a dreary, silent wood, absorbed in watching and netting the ghost-like insects which flit about him, until at last he is startled by hearing some church bell in the distant town ring out the ghostly preachment “ONE!” To penetrate into the most secluded corners of the Highlands in search of some special insect, and, indeed, to endure hardships which few people would credit as being true. What entomologist has not had his adventures? Some gentlemen of the “pill box and net” could narrate personal adventures which would put fiction to the blush. I have no doubt but our worthy Editor Mr. Robson, and Messrs. Gregson, Gardner, and the other Gentlemen whose names adorn the front page of this magazine, could tell strange stories regarding their entomological experiences. I am sure the readers of the *Young Naturalist* would be delighted to hear what these veteran entomologists have got to tell of their “strange experiences in search of insects.” I have had my fair share of mishaps, but cannot say that they in the least damped my liking for insect collecting. In fact, they were often the very means of making me all the more determined to persevere in the work in which I was engaged. If I visited a preserved wood where some rare insects occurred, and being met by the keeper, was taken to the proprietor’s house and threatened with

legal proceedings, was that sufficient reason why I should not go back again? I do not think so. I have been often caught and threatened, but could not resist going back to the same place shortly afterwards, and have never failed to obtain the desired permission to visit the estates whenever I pleased. It is this enthusiasm in an entomologist that overcomes all difficulties.

I have often thought it curious that, whenever I visit any part of the country new to me, no matter how beautiful and grand the scenery may be, my first thought is, "I really wonder what species of lepidoptera are to be found here?" In saying this I do not mean it to be understood that I have no eye for the beautiful—no one loves to gaze upon the rugged, heather-clad hills, the sparkling river, or the peaceful glen and pasture land, more than I do—but, somehow, my thoughts naturally revert from the beauty of the scenery to the various varieties of insects which are likely to be found there. It is a natural enough transition, and shows the peculiar likings of the individual. A geologist would think of the peculiarities of the rocks around, while a botanist would go in search of new plants for his herbarium. It is in thus having a special object of study that the student of nature has a great advantage over one who has no taste that way. I have some friends, who, when they go away to the country for their midsummer holidays, can never enjoy themselves for more than a few days. As soon as the novelty of the change of air and surroundings has worn off they become quite tired, and wish they were home again at their desks. I know this is very generally the case with people who go to the Highlands every summer as a mere matter of course, and it certainly is a very pitiful state of things. Does the entomologist grow tired of the woods and fields in this way? Go with him when he departs from the dusty town to spend a fortnight in some quiet secluded spot. Is he not light-hearted, and talking glowingly of what wonderful captures he expects to make if only the weather keeps bright? Every nook and corner for miles around are searched for their insect treasures, and if a new species is captured, which he has never seen before, he is as happy as a king. *He* never grows tired, and as likely as not, when his holidays are at last over, you will hear him bitterly complain of the cruel fate which demands a cessation of his pleasure. Let the weather, however, during his holidays be of such a disagreeable nature that he is confined to the house, and you have got a "grumbling bear" and a "disappointed man" at the one time.

On leaving town on a holiday the entomologist leaves his kid-glove respectability behind him. He is no longer the sharp business man known in town as John Tompkins, Esq., Wholesale Warehouseman, he is now only simply John Tompkins. Little would his business friends in town recognise in the

queer looking individual, who is running up and down yonder moor in desperate haste, with net in hand, and pockets stuffed full of pill-boxes, the affable Mr. Tompkins, with whom they have business dealings in the city.

In these few remarks I have attempted to show that enthusiasm is one of the chief characteristics of the entomologist, and, in conclusion, if any further proof were wanting that such is the case, I can only ask you to accompany any of your entomological friends on a collecting excursion, and I am sure you will be persuaded that entomologists possess that quality to a remarkable degree.

Kingston, Glasgow.

THE BUCKLER COLLECTION.

By JOHN HENDERSON.

(Continued from Page 75.)

Vanessa Io, in gardens about Lumley, larvæ fed up on stinging nettles, June 20th to 24th, emerged in July following. *V. atalanta* were mostly captured, some bred from larvæ found at Bedhampton, Lumley, and Westbourne, fed up July 1st to July 30th. *Cardui*, from very hairy larvæ, fed on mallow, from Worcestershire*, rest captured in Markham Fields, Sandown and Hayling Island, others bred from larva on thistle, full-fed July 31st, emerged August 31st, those from the hairy larvæ from September 26th to October 2nd, the latter ones being forced on February 3rd. The larvæ of *Sibylla* came from Woolmer Forest (C. G. Barrett) found on honeysuckle, full-fed May 25th to 29th, several specimens captured. *Iris* were captured by Mr. James Terry and Mr. Buckler, at Sandpit Hill; two larvæ sent by Mr. H. Doubleday fed up June 10th to 15th, emerged July 15th. *Galathea*, series taken at Long Coppice, a brood of eggs were successfully reared, the dates were, full-fed May 24th to June 9th, came out July 5th to 22nd. *Cassiope* and *Blandina* received in exchange, eggs of the latter from Yorkshire and Scotland, produced larvæ which fed on *Poa annua*, fed up June 4th, perfect insects out July 15th. *Algeria* taken in woods

* Two figures are given of this larva on Plate 8 of the "Ray Society's" last volume, and one of the pupa it produced. Both are much darker than usual, and the larvæ were covered with "a dense covering of pale grey hairs, nearly as long as spines, and almost hiding them." Another curious thing in connection with these Mallow feeders was they spun the edges of the mallow leaves together and lived within, in the manner of *V. atalanta*. Mr. Buckler asks whether they had "become hairy through eating the downy mallow," or they were "a second brood, thus clothed for protection against possible cold weather late in autumn."—Ed. Y.N.

near The Slip and Long Coppice. *Megara* were taken in lanes, a brood from eggs were reared on cocksfoot grass, fed up July 5th to 11th, came to imagines July 24th. *Semele*, larvæ found just beneath the sand amongst small scattered grass, close to the shore of East Hayling, fed up June 3rd, emerged July 24th, the remainder being taken on the wing. *Janira* were found in larva stage on hedge banks, full grown June 17th to 25th, and came out July 7th, besides which many were captured in meadows. *Tithonus*, the series were captured or bred from larvæ found on fine wood grass on banks, in Hants and Sussex, fed up July 15th to 18th, emerged in August. *Hyperanthus*, larvæ on fine grass in lanes and rides through woods at Long Coppice, fed up May 30th and June 1st, out June 27th to July 4th. *C. Davus* from Chat Moss, and larvæ reared from eggs received, fed up May 24th, came to imagines June 20th. *Pamphilus* taken and bred from ova from Sussex Downs, fed up July 30th to August 4th. *T. rubi* were taken at Westgate Hanger and Alder Moor, larvæ beaten from broom by C. G. Barrett, Rev. J. Hellins, and W. H. Harwood, full-fed June 29th to July 29th, emerged April 24th to May 9th. *Quercus*, larvæ beaten out at Westbourne Common, others from Exeter, fed up June 6th, emerged August 10th. *T. W-album*, fed on elm and wych elm, May 31st to June 15th, emerged July 2nd and 5th. *T. pruni*, larvæ on sloe and plum (Rev. J. Hellins), some from H. Doubleday, found on stunted blackthorn bushes at Epping, fed up June 13th to 16th, and emerged June 26th to 29th. *Betula*, caught by Mr. Doubleday, larvæ on blackthorn (Rev. J. Hellins) fed up on June 6th. *Dispar*, three specimens in poor condition. *Phleas*, larvæ on sorrel, sent by Rev. A. Fuller, of Staughton, fed up July 18th. *L. ægon*, series taken at Portsdown, some larvæ bred from eggs, fed up June 11th and emerged July 5th to 17th. *Agestis*, captured on railway banks, larvæ of *Artaxerxes* var. from Arthur's Seat, Edinburgh, full-fed May 23rd, and emerged on June 13th. *Alexis*, captured of course, and also bred from larvæ on retharrow (Emsworth), fed up July 30th, came out August 25th, and some on June 1st of the following year. *Adonis*, series caught at Brighton, *Corydon*, mostly caught at Portsdown, and Downs beyond Lavant, Sussex, larvæ from H. Doubleday, fed on *Hippocrepis comosa*, fed up June 12th. *Alsus* were taken at Adsdean chalk-pit, larvæ from eggs laid on flowers of *Anthyllis*, from Portsdown, fed up on July 24th. *Argiolus*, caught at Lumley, eggs laid on holly in his garden, produced larvæ full-grown in May, came out on June 30th. *Arion*, series from Gloucester and Salcombe, no mention of the larva. *Lucina* were taken at Watergate Hanger, eggs from the same place and others sent by the Rev. H. Harper Crewe, produced larvæ full-fed July 15th to 18th, emerged in April and May. *Alveolus*, the best part

from Slaughton Down and Westbourne Common. *Tages*, from Kingley Vale, a captured female laid eggs on *Lotus corniculatus*, Havant thicket, full-fed July 31st. *Paniscus*, series from Bagley Wood, Oxford. *Sylvanus* captured in many Sussex woods, a larva from Dr. Holland fed up May 4th, emerged June 8th; another from W. H. Jeffery, Chatham, fed up May 17th and emerged July 2nd, a warmer season. *Comma*, series captured at Portsdown. *Linea*, were taken by side of bridle paths, Long Copse and Stubbermere. *Actæon*, from Lulworth, the usual Dorset locality.

The Diurni are all in excellent order. These drawers were re-arranged, and completed by Mr. Buckler within a short time of his decease; the notes on larvæ are very full, and the perfect insects are mostly of his own setting, which, it is needless to say, is as accurate as possible.

In the Nocturni, the row of *S. ocellatus* include fine specimens bred from the egg by Mr. Buckler, others from larvæ found on willow and apple trees in Lumley, Sussex. *Populi* contains a series bred from the egg, others from larvæ found at Lumley and Malvern; three distinct varieties of the larvæ sent by Rev. J. Hellins, also produced the usual type of perfect insect. *S. tilia*, consist of a row bred from pupæ found at Elm, near Lumley Cottage, the rest from larvæ supplied by Mr. Hellins, of Exeter, which fed up on lime. The Death's Head (*Atropos*) is represented by eight of the finest bred specimens I have seen, they were chiefly from larvæ found on potatoe haulm, by children at Printhead and Westbourne, and two from dark vars. of the larva from Hastings. *Convolvuli* were caught by the Rev. J. Hellens (2), H. Dorville, of Alphington (4), and others; a fine preserved larvæ follows, with a remark "full-fed September 27th." *Ligustri* are bred from larvæ taken by Mr. Buckler, or brought to him by the villagers in 1855 to 1871 inclusive. Four *Euphorbia* caterpillars, from the Forest of Fontainebleu, were full-fed on August 14th, 1872, and the single specimen in this cabinet came out (forced) on November 23rd. There is a full row of *D. galii*, two specimens given by H. Doubleday, of Epping, four bred from larvæ sent by the late Nicholas Cooke, the others from larvæ found on *Galium verum*, at Paington, Devon, by Mr. H. Terry. *D. livornica* or *lineata* is here exhibited, a hibernating specimen taken by H. Terry, at Torquay; one caught in his garden by Rev. J. Hellins, and a larva from the same gentleman likewise. Another rare Hawk-moth (*C. celerio*), bred from a larva sent by Mr. F. Postans, of Newmarket, another dead larva is also mentioned. The Small Elephant (*C. porcellus*) are from larvæ presented by Mrs. Hutchinson, of Leominster, C. J. Watkins, of Painswick, and Rev. J. Hellins, full-fed August 28th. *C. elpenor*, five, bred from larvæ Mr. Buckler himself took on *Galium palustre* at Lumley, others from the green var. of larva from W. H. Harwood, of

Colchester, and the rest from Hertfordshire, full-fed August 13th. The Oleander (*C. neri*) marked "foreign" are two bred and presented by Professor Beck, of Bonn, very handsome moths, the English examples are generally worn at the wing tips. *M. stellatarum* were captured at Prinstead and reared from larvæ found at the side of a ditch, feeding on *Galium mollugo*; others from various localities, one by G. C. Bignell, of Plymouth, full-fed Aug. 13th and 31st. *Fuciformis* include one given, and three bred from larvæ sent by H. Doubleday in 1862 and 1866. Then comes *bombyliformis*, three captured by Mr. Buckler in Havant Thicket, one from Cambridge, and two from larvæ fed on *Scabiosa succisa* (H.D., Epping), full-grown July 22nd. The Clearwings also include *S. myopæformis*, several bred from larvæ in apple tree bark (Dr. Knaggs); *culiciformis*, from J. Steele, Congleton; *formicæformis*, from Folkestone; *chrysidiformis*, bred by himself and sent by Dr. Knaggs; *ichneumoniformis* and *cynipiformis*, several bred from larvæ found; *philanthiformis*, a series bred from Mr. Gregson's larvæ, and two from Torquay larvæ by Mr. Buckler. *Tipuliformis*, a common insect, include a series taken flying in the hottest sunshine at Lymington. The two Hornet Clearwings are *bembeciformis*, series from Mr. T. Porter, of Bolton; and *apiformis*, which Mr. Buckler received in exchange. A few of the above show signs of verdigris, the action of copper on the pin metal, being also visible in *Arundinis*, two from Mr. W. Farren (Cambridge), others not specified. The Wood Leopard (*asculi*) were mostly picked up on old rotten poplar trees in Camberwell, where *ligniperda* were also infesting the same trees. The Goat Moth series also include a moth taken at sugar on Westbourne Common, several from larvæ found in his neighbourhood, 14 from Camberwell New Road, &c.; larvæ generally full-fed in August and September, and perfect insects bred the following July. Some Goat larvæ were taken in an old willow at Feltham, Middlesex, by the present owner of the collection. The family of *Lithosia* include four *sericea* besides *pygmæola*, *caniola*, fine *quadra*, &c. A single example of *E. grammica*, marked "foreign," and a preserved larvæ of the same species, is next followed by a *pulchella*, from the South coast, a single slit in the margin of the left hind wing being its only drawback. The Tigers, remarkable for the absence of any striking variety in *caja*, are followed by the Eggars and remaining *Bombyces*, of which *versicolora*, *trifolii*, *ilicifolia* and *quercifolia*, are perhaps the best examples. The *Cuspidates*, always a most interesting division, are here well well represented by *lacertula*, *sicula*, and the other Hook-tips; then come the Kittens (*bicuspis*, however, absent), but eight very fine bred *fagi* (the Lobster), from the Southampton district, some *cassinea* and *nubeculosa*, probably sent from Rannoch. After the Chocolate-tips come the Prominents proper, *plumigera*, *palpina*, *camelina*, *cucull-*

ina, and some very large *carmelita*; the Swallows *dictæa* and *dictæoides*, *dromedarius*, *ziczac*, a good row of *trepida*, concluding with a choice assortment of *chaonia* and *dodonea*, very distinct and perfect, the whole of this part of the collection is in excellent order.

THE ORIGIN OF APTEROUS FEMALES

In the Genera *Phigalia*, *Nyssa*, *Hybernia* and *Cheimatobia*.

By ERNEST ANDERSON.

One of the first surprises to the Young Naturalist, on commencing the study of lepidoptera, is to find that many species have females, either with rudimentary wings or entirely lacking them; still after the first feeling of surprise the fact is accepted, and, as a rule, nothing more is thought of the matter. Personally, I have never quite got over this apparent "freak of nature," and have vainly enquired of more experienced entomologists, and have searched in books for the why and wherefore of its being so, but without results; until at last there has sprung up in my own mind a theory which I am conscious is weak and perhaps untenable, but which I will endeavour to propound, and trust that any of my readers who disagree with me will not rest with controverting my theory, but will advance one of their own on the subject.

To start with we must take as an axiom the Darwinian text, that the offspring nearly always inherit the peculiarities of their parents, which, I think, most of my readers will readily allow; but we must go a step further than this and say that given a pair of any lepidopterous species, of the offspring nearly all the females will resemble the original female, and the males the original male. That this is so we have abundant proof in the very many species that have a difference in the sexes, both in shape, colouring and markings, such as *O. potatoaria*, *A. prunaria*, *E. vespertaria*, &c., the occurrence of a male with the female markings or *vice versa*, being of very great variety. Thus generation after generation we find the females resembling the parent female and the males the parent male, each inheriting the peculiarities of what I may call its particular parent. Now arguing by analogy, I maintain that since this is the case in the colouring, etc, it is equally so in other respects and that if one of the original parents was what we term a "cripple," that is, had its wings imperfectly developed, its offspring would to a certain degree also inherit the same peculiarity, and a large proportion be "cripples" also *chiefly of the same sex*.

Taking the above to be correct, let us apply it to the species under consideration, all of which be it remembered, emerge in the cold stormy months from October to March, being in consequence more liable to accidents and unfavourable circumstances at the time of their emergence than any other species, and therefore have a large proportion of crippled specimens, a fact I can vouch for. Owing to the time of their appearance these species also suffer very much from the attacks of insectivorous birds, which being on short commons at that season of the year, search with surprising diligence in quest of food, going round and round the tree trunks, looking into almost every chink and cranny with a perseverance enough to drive an entomologist almost frantic, as visitors to Richmond Park after *Nyssia hispidaria* well know, for the "wretched tree creepers" seem to flit along in front of every tree, and it is not much use searching after they have finished.

Let us suppose that long ago, perhaps in those prehistoric times in which geologists revel, these species had winged females of the ordinary type, and with each brood a certain number of "cripples" of both sexes appeared. Now these "cripples" would be much better able to secrete themselves from the birds than their winged companions, and consequently in the struggle for existence they would stand a better chance, therefore, in the course of time, were no other causes at work we should have a race of "cripples" as the result of the survival of the fittest; but, as the males always seek the females, the "crippled" males would stand little chance of propagating their peculiarities, while the accident of being unable to fly would not affect the "crippled" females as the males would seek them out; therefore, we find that the more "crippled" a female was the greater chance she had of surviving and propagating, while the more perfect the wings of the male the more chance he had of finding a mate, thus we have the females developing less and less wings and the males more and more, untill we arrive at wingless or almost wingless females, and males with very large wings in proportion to their bodies. Having thus briefly outlined my theory I shall be glad to see the subject taken up in these pages. I am aware of many arguments on the other side, but will leave others to advance them. One of the chief will, no doubt, be that this theory will not fit the females of *O. antiqua* and *O. gonostigma*. In these cases the same effect has probably been arrived at in a different manner, but I think I have said sufficient in introducing what to me seems a very interesting subject, and shall now take leave of it, in the hope that next month's number will contain the opinions of others.

Devonshire Road, Hackney, London.

SIX MONTHS' WORK AMONG THE TORTRICES AND TINEITES.

By ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

M A Y.

I really marvel that more entomologists do not take up the study of the two groups to which this series of papers is devoted. Certainly they are not so showy as their bigger brethren the macro-lepidoptera, and on this account are less attractive than the latter, especially to young naturalists. It takes some time I know to get acquainted with the butterflies and larger moths, and I can quite understand that beginners are likely to prefer them to the micros, but when a lepidopterist has collected for two or three years, and obtained a fair knowledge of the Rhopalacera, Sphingidæ, Bombycina, Geometrina, Noctuidæ, &c., I think it is time he should give a little attention to the Tortrices and Tineina, and it is with the idea of affording encouragement and assistance to young naturalists, taking up these groups for the first time, that these papers are written.

I have expressed my surprise that so few entomologists study the Tortricina and Tineina, for to one who is a real lover of nature, a true student of the of the Creator's works and not a mere collector, there is very much interest attached to the habits of these little moths, especially in the larva state. How wonderful, for instance, is the instinct which teaches these little caterpillars to provide such cunningly contrived shelters for themselves. See how deftly some of the tortrices roll a leaf up and secure it in its position with silken threads. But above all observe the marvellous ingenuity with which many of the little caterpillars of the tineina construct cases which they carry about with them as if wearing a suit of clothes! If insects were classified according to their intelligence the case-making tineina and leaf-rolling tortricina would occupy a high place. The same may be said of the phryganidæ of course, for the caddis-worms are really—as every one can testify who has kept them in an aquarium—very knowing creatures.

May is an excellent month for those young naturalists who have not yet given attention to the leaf-rolling and leaf-uniting larvæ to commence their study. The olive green caterpillars of *Tortrix ribeana*, which may be found feeding between united leaves of plum and other trees, are sure to be among the first to engage attention. We meet with them everywhere throughout May, and may find them on most trees and shrubs. They vary in colour, whether there may not really be two species described under the name *ribeana* is a question I have never yet been able to answer satisfactorily. I am rather inclined to doubt, but yet, I must confess, I cannot discover very

much difference in the colour, &c., of the specimens of the moth, not sufficient at least to warrant me in asserting there is more than one species. Some of the larvæ are bluish instead of olive green, and some have black heads, while others have green ones. In all cases the spots are black.

From oak and hornbeam we may beat the larvæ of the pretty *Tortrix viridana* as well as those of *Catoptria fulvana* and *Tortrix xylosteana*. *Viridana* is green (rather yellowish behind), with black head and minute spots; *fulvana* is green, with a rough brown head, darker green on the back and spotted with black; *xylosteana* is of a dull olive colour, spotted with white, each spot having a minute black dot in the centre, and its head is black. *Fulvana* feeds on bramble as well as oak, and *xylosteana* may also be found on honey-suckle. They are all three generally distributed and more or less common.

The pale yellow black-headed larvæ of *Hypermaecia angustana* may be beaten from sallows and willow: it lives between united leaves. In the southern parts of England the red brown, black-headed and black-spotted *Penthina salicana* folds over willow leaves; and the bright green *Penthina capræna* lives in the willow shoots, which should be collected by those desiring to breed this moth,

The dull olive green *Penthina cynosbana* feeds on plum, hawthorn, sloe, and some other trees: the head, second segment, and spots are black. The green pale-headed *Tortrix corylana* may be beaten out of hazel and also dog-wood, and that of *Penthina betulatana* from birch. The generally common *Tortrix costana* may be found by searching marsh-growing plants; it is a dull looking dark brown larva, with a black head.

On nettles, my readers are sure to find abundantly, the larvæ of *Sericoris urticana*; and on rose those of *Dictyopteryx Bergmanniana*, it is a yellowish-looking pale green larvæ, with a black head, and second segment of the same colour. *Pardia tripunctana* is also very abundant in the early part of the month, on both cultivated and wild roses; it is reddish brown in colour with a black head. Rose shoots should also be collected now by those desiring of breeding *Spilonota roborana*.

My readers are sure to notice that, in May, the elm leaves are fastened together by some pale olive-green black-headed and black-spotted larvæ. These produce *Grapholita trimaculana*, a species which we find everywhere in abundance. They are easily reared and it will be well to collect them in large numbers, as interesting varieties of the moth, are very likely to be obtained. It comes out in June, and I will notice it more particularly next month.

The generally distributed dull brownish larva of *Retinia buoliana*, feeds in May, in the shoots of Scotch fir-trees. It has a black head and the second segment is also black. There are some other tortrix larvæ occurring about

this time on fir-trees, with the natural history of which I am not personally acquainted. None of them are at all common and I have never met with them, so I pass them over.

Besides *Spilonota roborana*, *Lampronia quadripunctella* also feeds inside rose shoots, and the mention of this species, brings us to the *Tineina* of which group, however, I shall be able to say but little this month and will merely briefly mention the principal larvæ, and their food plants.

Pepilla Curtisella, feeds in the shoots and young stems of ash trees, *Cerosotoma sequella* on limes and willows, *C. costella* and *C. radiatella* on oaks, *C. scabrella* in some places on apple, *Harpiteryx nemorella* on honeysuckle *Harpiteryx harpella* on honeysuckle and perhaps snowberry, *Phibalocera quercella* in a flat web on the underside of apple leaves and also oak and beech, *Depressaria costosella* on furze, *Gelechia rufescentella* in grass leaves rolled up so as to form a tube, *G. mulinella* on furze flowers, *G. vulgella* between united hawthorn leaves, *G. fugitivella* on maple and elm leaves, *G. leucateila* between united apple leaves, and also hawthorn; *G. mouffetella* on honeysuckle, *Glyphipteryx equitella* in leaves and shoots of biting stone crop (*Sedum acre*); *Argyresthia nitidella*, in shoots of hawthorn; *A. albistriella*, in those of sloe; *A. curvella*, in apple shoots; *A. sorbiella*, in shoots of mountain ash (occurs mostly in the north of England); *A. pygmæella*, in willow shoots; *Gracillaria elongella*, in alder trees, rolled lengthwise; *G. onomella*, in clover and rest-harrow leaves; *Coleophora lutipennella*, on oak and birch leaves in a case; *C. gryphipennella*, in a case on rose leaves; *C. nigricella*, in a brownish black case on apple leaves and also sloe and hawthorn; *C. anatipennella*, a case of sloe leaves, *N. B. nigricella*, makes a nearly straight case; that of *anatipennella*, is curved like a crook or a pistol at one end. See plate with *Young Naturalist* for September, 1884.

Besides these there are other case-making larvæ feeding in May. The following all belong to the genus *Coleophora*:—*Ibipennella*, on birch, not common; *palliatella*, *currucipennella*, on oak and willow leaves. Neither of these two last are common, both make dark brown nearly black cases shaped at one end like a pistol-butt, *palliatella* has a large scaly flap on each side, while the more æsthetic *currucipennella*, ornaments its case with several little projections along the back. *C. pyrrhulipennella* has been feeding in mild weather, since October, on heath. It and some others of the genus will be found on the plates with the *Young Naturalist* for 1884.

Other *Coleophora* larvæ are *conspicua*, on leaves of the black knapweed (*Centaurea nigra*); *vibicella*, on leaves of dyers' greenweed (*Genista tinctoria*); *ochrella*, on sun cistus leaves (*Helianthemum vulgare*); *discordella*, on leaves of birds'-foot trefoil; *troglydytella*, on common flea bane and hemp

agrimony; *lineolella*, on black horehound leaves (*Ballota nigra*); and *cæspitella*, which has been feeding all the winter in a short whitish case, on rush seeds. The only other species I have room for mention are *Batrachedra præangustella*, which unites leaves of poplar and willows; *Elachista cerussella*, in carex leaves; and *pollinariella*, in slender false broom grass leaves. I am reluctantly compelled to omit all mention of the imagines, both tortricine and tineine. Some of the larvæ I have left out were feeding, in a young state last month, and I mentioned them then.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

April 7, 1886.—ROBERT M'LACHLAN, F.R.S., President, in the chair.

The following were elected Fellows, viz.:—Messrs. Edward Capron, M.D., J. W. Ellis, L.R.C.P., F. D. Wheeler, M.A., J. B. Bridgman, F.L.S., T. D. Gibson-Carmichael, F.L.S., J. Rhodes, F.R.M.S., A. C. Horner, J. T. Harris, Evan John, Martin Jacoby, J. A. Clark, G. Elisha, and A. Sidney Olliff.

Mr. Crowley exhibited a number of Lepidoptera, including a long series of species belonging to the genus *Rhomalæosoma*, containing many unusual forms, lately received from Accra, West Africa; also, from the same locality, about sixteen species of the genus *Charaxes* in remarkably fine condition, and represented by specimens of both sexes. He also exhibited a number of large specimens of *Saturnia* from Natal, and several unknown species of other genera.

The Rev. W. W. Fowler exhibited four beetles belonging to the family *Carabidæ*. Three of them had been taken twenty years ago on the banks of the Clyde, and had lately been identified as *Anehomenus sahlbergi* (Chaud.), a species new to Europe, having hitherto only been found in Siberia. The remaining specimen was *Anehomenus archangelicus* (Sahlb.), a North European species nearly related to *A. sahlbergi*, but easily distinguishable therefrom by the greater depth of the striæ of the elytra.

Mr. J. W. Slater exhibited, on behalf of Mr Mutch, a spider belonging to the genus *Galeodes*, and a Lamellicorn beetle belonging to the genus *Cetonia*, which was at first supposed to be a monstrosity, but was afterwards found to owe its unusual appearance to the right elytron having been broken off and fixed on in reversed position. He also exhibited an undetermined species of a beetle belonging to the family *Curculionidæ*.

Mr. Billups exhibited a specimen of *Bassus bizonarius*, an ichneumon new to Britain, taken at Peckham in May, 1885; also a number of specimens of another parasite, *Dimeris mira* (Ruthe), taken in Headley Lane, Surrey, in March last.

Mr. White exhibited preserved specimens of the larvæ of two species of the genus *Catocala*, for the purpose of calling attention to some remarkable processes on the underside; and Prof. Meldola and Mr. J. Jenner Weir made some observations on them.

Mr. S. Edwards exhibited an unknown exotic spider, found in his orchid house at Blackheath.

Mr. H. Goss exhibited two remarkable varieties of the male of *Argynnis paphia*, taken in Sussex and Hampshire respectively.

Mr. A. G. Butler communicated a paper entitled "Descriptions and remarks upon five new Noctuid Moths from Japan."

The Rev. W. W. Fowler read a paper on "New genera and species of *Languriidae*," chiefly from specimens in the collections of the British Museum, the Cambridge Museum, Mr. Lewis's Ceylon collection, and the collection of the Rev. H. S. Gorham. In alluding to a species described in this paper, Mr. Champion remarked that he had taken the elongate form, and also the broader form, on trees as well as on low herbage in Central America. Dr. Sharp remarked that Mr. Lewis's experience of the habits of the species in Ceylon appeared to have been different.

Dr. Sharp read a paper "On some proposed transfers of generic names." This paper called attention to a practice advocated by Mons. Des Gozis, which was apparently extending on the Continent, of transferring the names of some of the commonest genera to other genera. The extreme confusion caused by the practice was pointed out, and the author showed briefly that the theory on which Mons. Des Gozis's system was based was as unsound as the practice itself was objectionable. Considerable discussion followed the reading of this paper, in which the Rev. W. W. Fowler, Mr. Waterhouse, Mr. M'Lachlan, Dr. Sharp, Mr. Pascoe, and Mr. Dunning took part. The last-named gentleman said that the discussion reminded him of a similar one, on the application of the law of priority to genera, which took place at a meeting of the Society nearly twenty years ago. The project was then condemned as unanimously as that of Mons. Des Gozis had been that evening; and he trusted that entomologists would hear no more of it.—H. Goss, Secretary.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

At the meeting held March 25th, there was a good attendance. Mr. Clark exhibited two specimens of *Nyssia hispidaria*, and also specimens of *Hybernia leucophearia*, *Progemmaria* and *Rupicapraria* all captured the previous day. Mr. Clark recorded that *H. leucophearia* and *A. æscularia* were in boundless profusion at Richmond Park. He had captured 23 females of

the latter species, which caused some surprise, as it is generally considered one the rarest of the apterous females. *B. parthenias* and *T. rubricosa* were also mentioned as having been captured. At the following meeting, Mr. Gurney exhibited a female *H. progemmaria*, almost black; Mr. Clark brought up a specimen of *X. lithoriza* bred that day, from ova obtained in 1885 from a captured female, also a fine and variable series of *Agrotis corticea* from Upper Clapston. Mr. Anderson mentioned having seen the first *Biston hirtaria* that day, which led to a short discussion as to the date of its being full out, the general opinion being that about April 6th to 12th is the time when they may generally be observed in profusion on the lime trees, &c.

On April 8th, Mr. Pearson recorded the following species from the shallows at Loughton: *T. gothica*, *T. cruda*, *T. stabilis*, *T. instabilis*, *X. lithoriza*, and also *A. badiata*, from Chingford. On the 15th, Mr. Hockett exhibited a series each of *A. agathina* and *A. obelisca*; Mr. Anderson had some dark varieties of *H. progemmaria*, from Walthamstow; and Mr. Clark brought up four specimens of *Lythria purpuraria*, two *D. pulchella*, two *G. smaragdaria*, two *N. subrosea* and one *E. sacraria*, from Dr. Gill's collection. Mr. May mentioned having obtained ten larvæ of *C. villica*, and also noted a great abundance of larvæ of *N. xanthographa*.—ERNEST ANDERSON, Secretary.

[The "Report of Clydesdale Naturalists' Society" and other matter unavoidably left over for want of space.]

NOTES AND OBSERVATIONS.

NOTE ON ANTISPILA PFEIFFERELLA.—During a short stay at Freshwater, Isle of Wight, in July last, I found the larvæ of this species in the greatest profusion in one of the many old fashioned lanes, with hedges six or eight feet high, that lead from Farringford to Totland Bay. There was only two good sized bushes of *Cornus sanguinea*, but nearly every leaf was mined by one or two larvæ; wanting the species badly myself, as also many of my friends, I collected a good supply. Again, I had long wished to verify a statement by Mr. C. Healy, in the *Entomologist*, vol. 2, page 129, and again mentioned in the *Nat. Hist. Vineina*, vol. xi. page 310, which has always seemed rather puzzling to me, that the larvæ when full-fed, cut out their oval cases, descend to the ground, and convey their cases under the surface of the earth, and then change to the pupa state. Now, this habit in a larva which is apodal, appeared to me most extraordinary, and to prove it I placed all the leaves I had, in several glass jars with open tops like ordinary tumblers, with some fine earth at the bottom, taken from the hedge where I obtained the

larvæ. I then buried all the jars half-down in a box of earth, that no light should get to the sides, and left them for about three months. I then carefully examined the sides of the glass jars, but could not detect one single case below the surface of the earth; I then carefully took out the layers of leaves in all the jars, and found the cases were all concealed between the decaying leaves, in exactly the same way as its congener *Trietskiella*, in some instances there were as many as twenty cases all close together in one patch. After carefully taking all the leaves out of each jar, I found numbers of cases on the surface of the earth, I then removed all these cases off the surface, and then turned the earth out of each jar on to a sheet of paper, but with all my careful searching I did not find in any of the jars one solitary case that was beneath the surface, so that I am quite convinced there must have been some error in Mr. Healy's observations, or the jam pots which he generally used must have been shaken by someone without his knowledge, and so the cases became mixed with the earth. He also says the species is very difficult to breed, which again is different to my experience, for by forcing in a temperature between 60° and 70° , I have, during the end of last month and the early part of this, had them emerging most freely.—G. ELISHA, 122, Shepherdess Walk, City Road, N., April 19th.

FURTHER NOTE ON *C. BRUMATA*.—Whilst overhauling my papers, &c., the other day I came across a scrap containing some information about *C. brumata*, which, although I remember making the note at the time, had altogether slipped my memory. I find that Mr. H. Andrews, of this town, had taken the species on the 1st March about ten years ago, and other friends tell me they have several times seen it near the end of February; yet these are certainly exceptional dates, it has, however, *often been seen* about the middle of February.—J. W. CARTER, Bradford.

NOTES AT SHERBURN, DORSET.—I have not seen one account of the abundance of *A. selene* and *L. agestis* last season. They were both of them unusually common in this neighbourhood. Previous to last summer they had been scarce for the last five years. Except the first fortnight of the new year, when *Brumata* and *Rupicaprarica* were swarming at night, I have hardly seen a moth as yet, and only *Rhamni* and *Urticæ* amongst the butterflies. The pretty bees *Andrena fulva* and *Clarkella* are out and the common *Bombi*.—C. W. DALE, Glanvilles Wootton.

PRESERVING THE COLOUR OF DRAGON FLIES.—To keep the colour of Dragon Flies stuff the larger ones after taking out the insides, and insert a hog's bristle through the abdomen of the smaller species.—C. W. DALE, Glanvilles Wootton, Dorset.

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SIX MONTHS' WORK AMONG THE TORTRICES AND TINEITES.

By ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

THE month of June is one in which all orders of insects are abundant, and the Lepidopterist especially is fully employed. So large a number of species of tortrices and tineites occur now, in the perfect state, that I fear it is impossible to describe more than a portion of them. The grey *Pædisa corticana* is abundant about hawthorn hedges, *Semasia Wæberana* is common on apple trees, *Coccyx nanana* is abundant among spruce firs in the Southern parts of England, the little brown, orange-spotted *Trycheris mediana* flies in the sunshine among umbeliferous flowers, *Stigmonota regiana* may be found about sycamores, *S. composana* is common in Southern clover fields, *S. intermana* and *Catoptria ulicetana* fly about furze bushes (the latter in great abundance in the day-time,) *Stigmonota coniferana* frequents scotch-fir trees in the North and *Sericoris urticana* is abundant in most places among nettles, the long-horned *Adela de-Geervella* flies in woods, *Prays Curtisella* occurs about ash trees, *Gelechia malvella* is common in some gardens where hollyhocks are grown, *G. vulgella* is generally common by the side of hedges and *Glyphipteryx thrasonella* is abundant among rushes.

But these are only a fraction of the species which occur in June, *Hypermeia augnstana* is common among sallows and willows, *Penthina cynosbana* is abundant by the side of every hedge, *Clepsis rusticana* is to be met with in most marshy places, *Tortrix ribeana* is common in gardens, *Pardia tripunctana* is abundant among wild and cultivated roses, *Chrysocorys festaliella* is common in many places among brambles and raspberry canes and many another species occurs now, some of which I will more particularly describe further on.

Before I do so, however, it will perhaps be as well to say a few words about the characters of the tortricina. Doubtless most lepidopterists are familiar with the shape of the wings of the moths of this group. Their short blunt fore-wings at once distinguish them from others, although some, as the common *Sciaphila nubilana*, have the wings more than twice their breadth in length, and in *Aphelia osseana (pratana)* they are as much as three times as long as broad. The palpi are also as a rule very short, but in both the species just mentioned and in some others, they are longer than the head; nevertheless in spite of these exceptions, the tortricines are, generally speaking, possessed of broad blunt fore-wings and short palpi.

If we attentively examine the fore-wings of these little moths we shall see a certain series of markings generally present. First we notice a patch of colour at the base of the wing and this is called the Basal patch. In many species there is a decided contrast in colour between the basal half and the rest of the wing, the colour of the basal patch extending as far as the middle of the wing or farther. Thus in *Pardia tripunctana* the basal portion as far as the centre of the wing is smoky brown; the other half is whitish clouded with grey and the tip of the wing is dark grey, also in the common *Spilonota suffusana* which we may see in most places at rest on the hedges, the basal part is dark grey-brown and the rest of the wing white mottled with grey.

In both these species we may observe an ocellated patch of lead colour near the anal angle of each fore-wing. This is known as the Ocellus and is another of the distinctive markings of the tortricina; there is also present in many species a central fascia and some have a spot on the costa near the tip.

In *Amphysa gerningiana* which occurs on moorlands and heaths in Scotland and the North of England, the central fascia is distinct and dark brown in colour, and the costal spot is also dark brown, with brown reticulations beneath it. The basal patch in this species is indistinct and the ocellus absent altogether. The ground colour of the fore-wings is yellowish brown, darker behind, and their expanse rather less than two thirds of an inch.

In *Hypermercia augustana*, the larva of which I described last month, when the specific name was erroneously printed *Angustana*, the basal patch is not always very distinct, but is in some specimens of a darker shade than the ochreous grey ground colour of the fore-wings, and extends nearly to the middle of the wing. Both the central fascia and the costal spot are in this species reddish brown in colour, and there is an extension of the latter which unites with the central fascia; sometimes there is a straw-coloured patch on the costal margin, just before the costal patch. The expanse of wings is half-an-inch or a trifle over.

In *Penthina ochroleucana* which we find in rose gardens in the South of England, the basal patch is dark dull brown, and excepting that it is paler between this and the central fascia, the brown colour extends over fully two-thirds of the wing, when it gives place to pale ochreous. In the abundant *Penthina cynosbana* which we may see everywhere about hawthorn hedges and sloe bushes, the contrast between the basal two-thirds and the rest of the wing is very decided; the former being brownish black and the latter white. It is the same in *Penthina pruniana* which is also abundant about sloe bushes. In the latter species the extreme tip of the wing is dark grey, which is not the case in *cynosbana*. These three species vary somewhat in size, *ochroleucana* is rather less than ten lines in expanse *cynosbana* averages eight or nine lines and *pruniana* about seven.

In *Sideria achatana*, another hawthorn-loving species, the basal patch is dark brown, and the ground colour of the fore-wings pale grey, the central fascia is only apparent on the costal and inner margins, on the former of which it is represented by a small quadrilateral patch and on the latter by a triangular one, both dark brown in colour. The costal spot is lengthened out into an oblique fascia. The size of *achatana* is about the same as that of *pruniana*. In *Spilonota roborana* the basal patch is brown and prolonged along the costal margin in the form of a streak extending to the middle of it. Beyond the middle the costa is white speckled with grey and the tip of the wing is reddish brown. A leaden-grey ocellus is present in this species, the outer edge of which is dark brown. The palpi are longer than the head and brown in colour, the fore-wings are more than twice as long as broad. It is about the same size as *cynosbana*.

Those who collected acorns last autumn for the purpose of breeding *Carpocapsa splendana* therefrom will, if they have been fortunate, now be rewarded by seeing the pretty little moths emerge. For the benefit of those who do not know this species, but may perchance meet with the imagines about oak-trees it will perhaps be as well to say that it is a whitish-grey moth about the size of *pruniana*, the basal patch is a darker grey and decidedly angulated at the outer edge, and the costal is streaked throughout its entire length with grey of a darker shade than the ground colour of the wing. The ocellus is edged with silver and is enclosed in a large blackish-brown blotch.

Some tortrices have no particular markings on their fore-wings as for instance the marsh loving *Clepsis rusticana*. In this species the basal patch, central fascia, ocellus and costal spot are all absent. The colour of the fore-wings is grey with a glossy or shining appearance and there is a large number of short streaks of an ochreous colour. In size it expands about half-an-inch. The female is yellower in colour and has narrower forewings,

Tortrix costana is another marsh loving species and this also has glossy wings of a pale yellow colour. The brown central fascia is visible on the costal margin, but fades away towards the middle of the wing; the costal spot (likewise brown) is distinct, and there are two or three dark brown dots below it; the hind wings are white. Specimens vary in size, from a little over two-thirds of an inch to very nearly an inch.

Tortrix viridana on oak, *Penthina ochroleucana* on rose, *Dictyopteryx forskaleana* in folded maple leaves, *Leptogramma boscana* between united elm leaves, *Peronea variegana* on hawthorn-bramble and also rose, and *Chrosis rutilana* which may be found on the Chalk Downs in the South of England, in a web spun amongst juniper twigs are some of the tortrix larvæ feeding in June, and these are all I have room for. Among the tineite larvæ are *Swammerdamia cæsiella*, *Scythropia cratægella* and *Hyponomeuta padella* on hawthorn, *Hyponomeuta plumbella* and *evonymella* on spindle, *Hyponomeuta malinellus* on apple, *Plutella xylostella* on cruciferous plants, *P. Dalella* on arabis, *Cerostoma sequella* on limes and willows, *C. radiatella*, *costella*, *lucella*, *Ypsolophus sylvella* and *Phibalocera quercella* on oak, *Depressaria umbellula* on furze, *D. arenella* in thistle leaves as well as those of knapweed, *D. conterminella* in terminal shoots of willows and osiers and *D. applanella* in folded leaves of several umbelliferous plants. These are all I have space for.

I have mentioned one or two tineina which occurs now in the perfect state, but I am compelled to omit the remainder.

Cambridge.

THE ORIGIN OF APTEROUS FEMALES.

By G. PEARSON.

All will agree with Mr. Anderson, that this interesting subject is worthy the attention and discussion of entomologists, and doubtless every one has a theory of his own, to account for this curious want of development in the female of certain species—

“For what thou hast not, still thou striv'st to get,”

would suit the case of many, and cause such knotty questions to be passed by, in our haste to get a “good series.”

I do not quite agree with Mr. Anderson's theory that the absence of wings gives them a greater security from the attacks of their natural foes, and has been produced by causes operating to that end. My own theory is that this

retarded development enables the female to economise its vital force and energy, and so increase its power of reproduction.

It is a Darwinian axiom, I think, that an organ which is no longer of service, loses its power and becomes more or less rudimentary. Now we often find from experience that a fondly cherished pupa of a good thing, develops a specimen with rudimentary wings, and, after a time, we awake to the mournful fact that they never will grow, from some cause we are not able to determine. Supposing a females able to dispense with wings in propagating its species, and with crippled or partially developed wings, it would have an advantage over other specimens which had dispersed their vital force in developing these delicate organs, propagate a greater number of offspring, with an inherited tendency this accident of birth, and by that process known as the survival of the fittest produce a species having apterous females. It is worth noting that all apterous females are very prolific, the species produced rather small, and that the economy of vital force thus effected is a distinct gain. I am sure if entomologists will give their theories and opinions on this subject, if it is not settled to the satisfaction of all, it will at least, leave it in a more satisfactory position.

Stoke Newington, London.

THE GEOLOGY OF KENT.

BY GEO. E. EAST, JUNR.

The inhabitants of Kent have great facilities for the study of the rocks of their county. All along the coast admirable sections are exposed in the cliffs, and inland the absence of the surface deposits, which under the name of drift, so obscure the geology of the counties north of the Thames, permit the various strata to be traced with comparative ease. I purpose in these notes, as in my last, simply to mention the formations as they occur, and to give a list of some of the chief fossils. To begin with the oldest rocks which are the:—

WEALDEN BEDS.—The strata included under this term have a maximum of more than 2,000 feet. They are divided into two beds, viz. the Hastings Beds and Weald Clay.

THE HASTINGS BEDS.—These are chiefly sandy, and occupy the south of the county.

THE WEALD CLAY.—This constitutes a low flat tract of land from four to six miles wide; it is a brown or blue clay, ill drained, and mostly in pasture.

The chief fossils of the Wealden Beds are :

Hastings.

Cyrena media, *C. parva*, *C. obtusa*, *Melania strombiformis*, *Paludina fluvi-
orum*, *Unio Valdensis*, *U. porrectus*, *U. subsinuatus*.

St. Leonards.

Cyrena media, *C. elongata*, *Paludina fluvi-
orum*.

THE LOWER GREENSAND.—The strata known by this name forms a picturesque hilly ridge, running from the coast at Hythe by Lympne, in a north-west direction to Sevenoaks, and then due west to Westerham. It is divided into four divisions, these being

Folkestone Beds, 90 feet.

Sandgate Beds, 80 feet.

Hythe Beds, 120 feet.

Atherfield Clay, 30 feet.

THE FOLKESTONE BEDS consist of light coloured sands, sometimes very coarse, including layers of siliceous limestone and chert.

THE SANDGATE BEDS.—These consist of dark clayey sand and clay, with few fossils.

THE HYTHE BEDS.—These consist of limestones, sandstones and sands, with iron sandstone and chert.

THE ATHERFIELD CLAY.—This formation consists essentially of clay, with in places, calcareous bands.

The chief fossils of the Lower Greensand are :

Hythe.

Trigonia ornata, *Pinna galliennii*, *Inoceramus sulcatus*, *Gervillia anceps*,
Pecten quinquecosta, *Rhynchonella parvirostri*, *Plicatula ptacunea*.

Maidstone.

Modiola bella, *Terelratula depressa*.

Sandgate.

Lima cottalina, *Rhynchonella sp.*, *R. gibbsiana*, *R. depressa*,

Lympne.

Anomia levigata, *Astarte laticosta*, *Exogyra canaliculata*, *E. Boussingaulta*,
E. haliotordea, *Lima cottaldina*, *Modiola lineata*, *Ostrea macroptera*,
Pecten interstriatus, *P. quinquecostatus*, *Philadomya gigantea*, *Plicatula
ptacunea*, *Trigonia caudata*.

THE GAULT.—Between the ridge formed by the Lower Greensand, just described, and the Chalk escarpment there is a narrow and well marked valley. The bottom of this valley is formed of gault, which is a stiff blue clay, 100 feet thick, at Folkestone, where at Copt Point and Eastwear Bay fine sections

of the bed are seen resting on the Lower Greensand. Folkestone has always been a famous place for collecting Gault fossils, and it has been divided into the following zones :

Upper Gault (about 72 feet)—Zone of *Ammonites rostratus*, *Kingena lima*, *Ammonites varicosus*, *A. cristatus* (Nodule Bed).

Lower Gault (about 28 feet)—*Ammonites auritus* (Dark Bed), *A. denarius* (Mottled Bed), *A. lautus* (Coral Bed), *A. De la Ruei*, *Crustacea (Palæocorystes)*, *Ammonites auritus*, *A. interruptus*.

Among the chief fossils of the Gault are the following :

Folkestone.

Aconæa tenuicosta, *Alaria carinella*, *Ammonites auritus*, *A. benittæ*, *A. carnatus*, *A. aenarius*, *A. Goodhallii*, *A. interruptus*, *A. lautus*, *A. mammillaris*, *A. splendidus*, *A. tuberculatus*, *A. rostratus*, *A. velleda*, *Ancyloceras opingerata*, *Apporhais Orbignaiana*, *A. Parkinsoni*, *Belemnites attenuatus*, *B. minimus*, *Bellerophina minute*, *Buccinum gaultinum*, *Cadulas Gaultinus*, *Cardita tenuicosta*, *Cidaris Gaultina*, *Cucullæa carinata*, *C. glabra*, *Cyprina regularis*, *Dentalium decussatum*, *D. ellipticum*, *Exogyra conica*, *Etyus Martinii*, *Fusus rusticus*, *F. Smithii*, *Gervilla solenoides*, *Gastrochana pyriforma*, *Hamites attenuatus*, *H. compressus*, *H. intermedius*, *H. maximus*, *H. tenuis*, *H. tuberculatus*, *Hemiaspasterias*, *Helicocerus rotundus*, *Inoceramus concentricus*, *I. solenoides*, *I. sulcatus*, *Lima parallela*, *Leda Mariaæ*, *Lucina tenera*, *Mytilus Gaultiennei*, *Natici Clementina*, *N. gaultina*, *N. saultina*, *Nautilus inagualis*, *Nucula bivirgata*, *N. ornaticissima*, *N. pectinata*, *Ostrea frons*, *Plicatula pectiroides*, *Pecten quadricostatus*, *P. quinquecostatus*, *P. Rauliniana*, *Panopæa plicata*, *Pholadidea constricta*, *Palæocorystes Broderipii*, *P. Stokesii*, *Pentacrinus Fittoni*, *Rissoina incerta*, *Rostellaria carinata*, *Salarium conoideum*, *S. ornatum*, *Serpula plexus*, *S. antiquata*, *Trigonia Fittoni*, *Trochus decussatus*, *Turritella Vitrayeana*, *Turrlites elegans*, *T. catenatus*, *Venus tenora*.

Maidstone.

Actæa affinis, *Dentalium ellipticum*, *Lima parallela*, *Uncula ovata*, *Salarium ornatum*.

THE UPPER GREENSAND.—This formation is very thin indeed in Kent. North of Folkestone and in Eastwear Bay we see greenish sandy beds, about 20 feet thick, lying above the gault. Inland there is no exposure except in the brick pits where the gault clay is dug.

THE CHALK.—This formation may be described as a soft white limestone, for it is almost wholly composed of carbonate of lime, and it is characterized in its upper part by nodules and bands of flint. The total thickness

of the chalk varies from 600 feet on the west of the county near Waterham, to 900 feet as shown in the cliffs on the coast.

In the splendid sections afforded on the coast, the following sub-divisions may be recognised, commencing on the north in the Isle of Thanet and walking southwards—

Chalk, with few Flints (Margate)	-	-	-	80 feet.
„ „ many Flints (Broadstairs to Dover)	-	-	-	350 „
„ „ few „ (Dover)	-	-	-	130 „
„ without flints	-	-	-	270 „
„ Marl	-	-	-	70 „

Among the chief fossils of the Chalk are :

Dover.

Magas pumilla, *Kingena lima*, *Rhynchonella plicatites*, *Ostrea frons*, *Pecten fissicosta*, *Lima parallela*, *Crania Ignaberginsis*, *Cyphosoma radiatum*, *Echinothuria floris*, *Salenia granulosa*, *Echinoconus castanea*, *Goniaster coombii*, *Ventriculites mammillaris*, *V. decurrens*, *Ammonites navicularis*, *Nautilus elegans*, *Beryx ornatus*, *Corax heteradon*, *Odontaspis gracilis*.

Gravesend.

Ananchytus planus, *Cidaris subvesiculosa*, *C. clavigera*, *C. hirudo*, *C. sceptrifera*, *Cyphosoma corallare*, *C. granulosum*, *C. Konigii*, *C. radiatum*, *Echinoconus castanea*, *E. conicus*, *Goniaster uncatatus*, *Ptychodus polygyrus*.

Northfleet.

Magas pumilla, *Cidaris sceptrifera*, *C. clavigera*, *Parasmilia centralis*.

Maidstone.

Cidaris sceptrifera, *Discoidea cylindris*, *Enoplachytia sussexiensis*, *Ptychodus mammillaris*, *P. gibberulus*.

Bromley.

Cidaris perornata, *C. sceptrifera*, *C. clavigera*, *C. subvesiculosa*, *Cyphosoma Konigii*, *Echinothuria floris*, *Goniaster angustatus*, *G. Hunteri*, *G. Mantelli*, *G. Parkinsoni*, *G. Sultanatus*, *Holostoma contingens*, *Micraster cor-anquinum*, *Salenia granulosa*, *Parasmilia centralis* (*Corax heteradon*).

Woolwich.

Anachytes ovata, *Beryx Lewesiensis*, *Cidaris sceptrifera*, *C. clavigera*, *C. subvesiculosa*, *Dercetes elongatus*, *Galerites albo-galerus*, *Goniaster coombii*, *Micraster coranquinum*, *Parasmilia centralis*, *Pecten nitidus*, *Spondylus spinosa*, *Terebratula carnea*, *Terebratula semiglobosa*.

THE TERTIARY PERIOD.—The Chalk ends a series of deposits classed as Secondary or Mesozoic (middle life) and the Strata we have now to describe belong to an entirely different and later time, known as the Tertiary or Cainozoic (recent life) period: they constitute a tract of land from

six to eight miles wide, running along the south side of the estuary of the Thames.

THE THANET SANDS.—This formation is composed of a series of fine light coloured sands, and are well exposed in the Isle of Thanet, from whence they take their name.

The chief fossils are :

Herne Bay.

Astarte tenera, *Corbula requiensiensis*, *Cucullæa deussata*, *Cyprina Morresii*, *C. planata*, *Cytherea orbicularis*, *Glycimeris rutupiensis*, *Modiola aystii*, *M. Mitchellii*, *Nucula curvata*, *Ostera belloracina*, *Pectuncatus terebratularis*, *Thracia oblata*.

THE WOOLWICH AND READING BEDS.—These beds repose upon the Thanet Sands, and are from 20 to 50 feet thick, and consist of alternations of mottled clays, with sands and pebble beds. They are well exposed at Charlton, Cobham Park, and in cliffs east of Herne Bay.

Charlton.

Cerithium, *Fusus*, *Hydrobia melania*, *Melanopsis*, *Neritina*, *Planorbis*, *Rissoa*, *Cyrene*, *Nucula*, *Ostrea*, *Psammobia*.

Upnor.

Melanopsis fusiformis, *Cyrena tellinella*, *C. cuneiformis*, *C. cordata*, *Cerithium funatum*, and sharks's teeth (*Lamna elegans*.)

Woolwich.

Arca depressa, *Cerithium funatum*, *Cyrena depressa*, *C. tellinella*, *Hydrobia Websteri*, *Melania inquinata*, *Melanopsis subfusiformis*, *Ostrea bellovacina*, *O. tenera*.

Blackheath.

Cyrena cordata, *C. deperdita*, *C. cuneiformis*.

OLDHAVEN BEDS.—These are beds of flint pebbles and sand, they are well seen at Oldhaven Gap, west of Reculvers, and they form the surface of Blackheath and Plumstead Common, and are from 20 to 30 feet thick.

The following fossils have been found at

Charlton.

Sharks teeth, *Auricula*, *Calyptræa*, *Cerithium*, *Fusus*, *Hydrobia*, *Melania inquinata*, *Melanopsis*, *Murex*, *Natica*, *Neritina*, *Planorbis*, *Pseudoliva*, *Arca*, *Cardium*, *Cyrena cordata*, *C. cuneiformis*, *C. intermedia*, *Modiola*, *Nucula*.

THE LONDON CLAY.—This is a stiff blue or grey clay. Under London it is 400 feet thick, but 480 feet in the Isle of Sheppy; it forms the top of Shooter Hill and the hills round Sydenham; it also constitutes the

well-wooded tract lying between Canterbury, Whitstable, and Hern Bay; it is the top bed in fine exposure at Loam-pit Hill, Lewisham, but the best place by far at which to study it is the Isle of Sheppy, here it is seen to contain bands of septaria, which are nodules of impure carbonate of lime, and also much iron pyrites.

Great number of fossils are found at Sheppy, among which are
Sheppy, Isle of

Nautilus Sowerbyi, *Bassinotopus Lamarckii*, *Hoploparia ganimaroides*, *Archæocarabus Bowerbankii*, *Goniaster Stokesii*, *Xanthopsis bispinosa*, *X. nodesa*, *X. Leachii*, *Nipadites umbonatus*, *N. ellipticus*, *Cumcumites variabilis*, *Palæophis toliapicus*, *Chelone sp.*, *Megalormis emuanus*, *Elasmo-branch vertebræ*, *Myliobates toliapicus*, *Pycnodus toliapicus*, *Ampheristus toliapicus*, *Goniognathus coryhænoïdes*, *Sciænurus Bowerbankii*, *Otodus obliquus*, *O. macrotus*, *Lamna elegans*, *L. dubia*, *L. compressa*, *Brychætus Mulleri*, *Odontopteryx toliapicus*, *Argillornis longipennis*.

BAGSHOT BEDS.—The Lower Bagshot Sands may be seen capping the London clay in the cliffs near the east end, in the Isle of Sheppy.

POST TERTIARY DEPOSITS.—The absence of the Drift (glacial clays and gravels) allows us at once to state that all various beds of gravel, sand, or brick earth, which rest in an irregular manner on all or any of the rock masses we have been describing, are due to the agency of atmospheric agents of denudation, of which rain and rivers take the chief place. Thus the "Bone-bed" at Folkestone is a deposit of marl and flint gravel, which is considered to have been deposited by the stream which now flows into Folkestone Harbour, no less than a hundred feet beneath it. The beds of brick-earth and gravel, at Crayford and Erith, are favourite hunting grounds of London geologists; here many species of land and fresh-water shells occur.

Erith.

Bythinia tentaculata, *Valvata piscinalis*, *Helix cantiana* (land), *H. nemoralis* (land), *Succinea putris*, *Limnea peregra*, *Planorbis marginatus*, *P. spirorbis*, *P. corneus*, *Ancylus fluviatilis*, *Planorbis carinatus*, *P. vortex*, *Anodonta cyanea*, *Sphærium corneum*, *Pisidium amnicum*, *P. fontinale*, *Unio pectorum*, *Valvata cristata*, *Carychium minimum*, *Helix hispida*, *Pupa marginata*, also remains of elephants, rhinoceros, bear, &c.

PRE-HISTORIC MAN.—Numerous and important discoveries of the first implements, which are almost the only records we possess of the first inhabitants of these islands, have been made in the county of Kent, on the sea shore between Hern Bay and Reculver, more than a hundred of the early

or Paleolithic type of implements have been picked up, they have undoubtedly fallen from the gravel beds which caps the cliffs.

Of the later or Neolithic Stone Period many finds of celts (axe heads), flint flakes, arrow heads, &c., are recorded from Canterbury, Folkstone, Isle of Thanet, Ramsgate, Maidstone, &c.

ENTOMOLOGICAL RAMBLES.

No. 3.

By ERNEST ANDERSON.

WEST WICKHAM WOODS.

Wickham! I love to wander thro' thy rides,
 Thy winding footways thick with wild flowers strewn,
 Amid the lofty oaks that grow on every side,
 And tangled ragwort rich with golden bloom;
 Or where the ranks of stately pine,
 A glowing grandeur 'neath their branches keep,
 With here and there a gap, through which the sunbeams shine,
 As tho' they wished to break that silent sleep.—E.A.

Thinking that a short account of a few days collecting in the above beautiful and favourite locality, might prove of interest to readers of this magazine, I am induced to extract from my diary the following particulars of captures during the last few days of March, 1880.

I started on the 26th, by a train leaving London Bridge at 8.30 a.m, and by the time the woods were reached, the sun was shining brightly, there was hardly any wind, and everything seemed to promise a beautiful day.

Arrived on the ground, a brother entomologist was met and we agreed to work together, being soon fully ready for business.

Very soon a specimen of *Brephos parthenias* was observed dashing along, and upon getting on a large space of heath surrounded with birch trees, this species was found fairly abundant, but, owing to my only having a short net, it was very difficult to capture them and it took me several hours to obtain three. My companion being better equipped was however much more fortunate.

When I had raised my total to six we decided to go round to the Shirley Hills, which are a short distance from the woods. On the way I took a nice *Hybernia progemmaria*, and also a specimen of *Cymatophora flavicornis*, which was circling round in the hot sunshine in a dazed sort of manner, finally pitching down head first among the dead leaves. Upon reaching the hills nothing was observed but a pair of *Parthenias* which, after an exciting chase

succeeded in escaping; we therefore made our way to the cottages and procured some tea, taking one *T. stabilis* and one *T. gothica* from the fences. Afterwards wending our way to the station, well pleased with the beautiful day we had experienced and determined to come again very shortly.

The next day I went to work and manufactured a net some six feet long, and on the 28th, I again took my place in the 8.30 train, and was soon carefully searching the celebrated "Bishop's fence" in hopes of some of the early noctuæ, or perhaps even the rare *Lophopteryx carmelita*, which has been taken here on several occasions, the particular spots on the fence being reverently shewn the young beginner by their older comrades. No such good fortune, however, was in store for me, for I could not discover a single specimen of any kind, a fact explained by the presence of several other entomologists who had preceded me, and with whom I subsequently came up, one of them taking a fine male *Amphydasis prodromaria* from an oak tree, just as I was going to look at the tree myself. I next turned my attention to the fir trees, and a little beating soon produced some larvæ of *Thera variata*, and also to my great delight a very fine specimen of *Trachea piniperda*, which came tumbling down into the umbrella, and then stood with quivering wings a beautiful sight amongst the dark fir needles. It was soon safely housed in a chip box, and the sun beginning to shine out brightly, I got my new net into order and kept a sharp look out for *Brephos parthenias* but they were not nearly so abundant as on the 26th, and after several hours work I had only two specimens.

Leaving the wood, I met a fellow member of the "Haggerston Society" who had captured two *Tephrosia crepuscularia* (the old *laricaria*.) As I wanted this species and he wanted *parthenias* we exchanged specimens, and on my way to the cottages I obtained a male *crepuscularia* myself and also two larvæ of *Cleora lichenaria* from the top of an old fence. At the cottages I met another old friend who was stopping for a few days, and having procured accomodation for the night, I gladly arranged with him to have a turn at the at the Sallows, accordingly after dusk, we journeyed down to the wood, where several large sallows grow in the midst of a thick birch plantation, so that it was impossible to look at the blooms, we therefore took off our overcoats, spread them under the trees, and a few shakes soon brought down *T. stabilis* and *T. cruda* in abundance, together with a few *T. gothica*, *T. instabilis* and *A. spadicea*. We took what we required of these species and returned to Shirley and bed about ten o'clock as we wanted to make a long day of the morrow.

Six o'clock the next morning found us up and doing, a white haze enshrouded everything, and there had been quite a frost during the night. The fence was almost as unproductive as on the previous day, a solitary specimen

of *Selenia illunaria* being the only capture. Among the pines, however, another *Trachea piniperda* fell to my share, this time resting on the trunk.

Having had breakfast, we tried the pines on top of the Shirley Hills, the result being a fine *Amphydasis prodromaria*, and one *Hybernia progemmaria*. From thence we went once more to the woods after *Brephos parthenias*, and found there some six or eight other entomologists all after the same species. The bright sunshine, the long nets waving about, and the little "High flyers" dancing here and there as though they enjoyed the fun, altogether made up a merry picture, and time glided away so quickly that we were surprised to find it was five o'clock and time for tea. We found our total to be about two dozen, and the road home produced another *Tephrosia crepuscularia*, three *Anisopteryx œscularia*, and a few larvæ of *Melanippe montanata* from the underside of primrose leaves.

Thus ended what was to me a most enjoyable trip. I have since taken most of the species mentioned in greater abundance, but I look back with pleasure to the time when almost every species was a prize, and to my first acquaintance with the beautiful locality from which I am sorry to say the entomologist is now to a great extent excluded. Still parts even now are open, while Shirley, capped by its towering pines, and studded with waving birch is free for ever, and the young entomologist, in search of a good locality may indeed go further and fare worse, than in paying a visit to Wickham.

THE BUCKLER COLLECTION.

By JOHN HENDERSON.

(Continued from Page 96.)

The earlier Noctuæ, according to the arrangement generally followed, include a good series of *T. Derasa*, a very fine row of *Batis*, which appear to have been bred, but there is no note attached, this and the preceding species are readily obtained at sugar. *Duplaris* are very fair, and *Fluctuosa*, a handsome insect, is shown in the collection by some monstrous specimens. *Ocularis* bred from pupæ dug up at Lumley. *Diluta*, a full series, and the Birch frequenting *Flavicornis* are also complete. *Ridens, glandifera* and the other *Bryophilas*, bring us to *Orion*, a truly remarkable row; this is generally considered a plentiful insect in Hampshire, hence the fine series Mr. Buckler has met with. The *Acronyctas* are chiefly remarkable for intensely dark and suffused forms of *ligustri* and *rumicis*. *Alni* is now becoming a more plentiful moth, a lovely row, including bred specimens, represents this former rarity. The other good species *auricoma*, *myricæ*, and *strigosa*, are not so

perfect, but they are always difficult to get. Passing over the Wainscots, which with other genera, will need a more careful examination, I would next remark the evident care that has been taken with the long bred series of *Agrotis*. This family Mr. Buckler was much interested in, and succeeded in thoroughly working out the difference between *aquilina* and *tritici* by means of the larvæ. His graphic and life-like descriptions of caterpillars of these species *nigricans*, *tritici*, *aquilina*, and *obelisca*, are doubtless familiar to all who have read the old "Entomologists' Monthly Magazine," the descriptions themselves being embodied in Newman's "British Moths." Amongst the 6,000 drawings of larvæ, which this indefatigable artist has left, a very beautiful selection of the common Garden Dart, White Line Streaked and Square Spotted Darts are enumerated. It is surprising how little we know of these *Noctua*. Mr. Buckler's series of *aquilina* are readily distinguished from *tritici*; he did not secure so good a selection of *cursoria*, which being a coast insect, would be a little out of his reach; *ripæ*, *suffusa*, *saucia*, *cinerea*, and *corticea*, the two last evidently not bred examples, are here also. *Agathina* and the beautiful heath-feeding *porphyrea*, the so-called Portland moth *A. præcox*, and *ravida*, of which our esteemed artist has described three different larvæ, from all of which he bred the moth, are also fully represented by a complete row of moths, about the life history of which the forthcoming second or subsequent volumes of the Ray Society will doubtless be able to instruct us. The row of *Ashworthii* at the end of this family then brings us to the Yellow Underwings. *Fimbria* are fine, of course, the larvæ being as plentiful in Hampshire as they are in the neighbourhood of London. *Subsequa*, a much rarer insect is also complete; and the Noctuas proper, from *Glareosa* to *Xanthographa* are well exhibited. Special attention is attached to *Ditrapezium*, eight of which were bred from larvæ taken on Westbourne Common, in February, March, and April, the larvæ being full-fed in May (1862), and the perfect insects emerged from July 2nd to 5th. *Triangulum*, which larvæ will also be figured in the Ray Society's publication, were taken (eight of them) at the same locality—Westbourne—the dates being nearly similar, the moths emerging July 2nd to July 10th. *P. alpina* came from Mr. George Clarke, being Rannoch specimens; *Tæmiocampæ* are all here of course; *Gothica*, fine bred examples, *Leucographa* are likewise very fine. The favourite sallows are represented by *Rubiginea* very perfect; *Croceago*, a nice row, *citrago*, *silago*, *aurago*, *gilvago*, and *Xerampelina*, the latter larvæ Mr. Buckler was fond of, and its description is published in Newman's Moths. Next we have *subtusa*, very good; *retusa* also and *fulvago*; but *D. Oo* has only a single example, which is strange, being a New Forest Noctua. Then follow the *Cosmias* and *ochroleuca*, the latter very handsome. *Carpophaga*,

the southern pale forms predominating, *capsophila* fine, *albimacula*, *cucubali*, *consersa* and its congener *Barrettii*, which Mr. Buckler satisfactorily proved was not a *Dianthæcia*, but an isolated melanic form of *Luperina luteago*, to which genus I see you have properly transferred it. These are all well set and choice specimens. *Cæsia*, *Drysodea*, and *Pobias* succeed these, *flavocinata* and *templi*; *Aprilinia*, very large females; *Empyrea*, fine bred series; and *lucipara*, bred from Lumley Cottage larvæ lead to the *Hadenas*, which are all good. *Solidaginis*, the rare *furcifera*, *vetusta*, *exoleta*, and *rhizolitha* with some bred *semibrunnea* and *petrificata*, bring us to the *Cucullias*. The Rev. J. Hellins calls my attention to *Scrophulariæ* and *Verbasci*, I must say by gas-light they are hard to distinguish, but a careful examination shows the difference. Pale specimens of the Mullein Shark are often mistaken for the rare species, but *Scrophulariæ* is a shorter and stouter moth, more like *Lychnitis*. *Verbasci*, by day-light, is a reddish brown insect, with a broad costal streak gradually shading off to the ground colour. In *Scrophulariæ*, the costal streak is much darker brown, nearly black, narrower than in *Verbasci*, and with a much more distinct outline below. *Lychnitis* is like *Scrophulariæ* in size and colour, but the costal streak is still narrower and the inner edge still more distinct. *Lychnitis* has more of the pale ground colour, and *Verbasci* less than the rarer species. I regret there are no records with the specimens shewing where they were obtained, but I assume them to be British examples, probably bred from the larvæ presented to him by the late Henry Doubleday, and described in the E.M.M. for 1867. *Asteris*, *absinthii*, and *chammomillæ* are all good, but the highly-prized *gnaphalii* is absent. *Venustula*, from Epping—a good row, some nice *fuscula*, *argentula*, and *unca* follow. There are no examples of *Ostrina* or *parva*, but *parthenias*, *notha*, *urticæ*, and *triplasia* are bred specimens. A moderate *orichalcea*, with *chrysitis*, *bractæa*, *festucæ*, *pulchrina* follow. *Interrogationis*, bred from larvæ found in Scotland by Dr. F. B. White, was full-fed June 11th and emerged July 9th, others from G. Clark, of Rannoch. *Pastinum* are fair, one good *Cracæ*, some *anomala*, the common insects intervening being all represented. A couple of lovely *fraxini* are marked "bred from Foreign ovæ," *Nupta*, *promissa*, and *sponsa*, the "Crimsons" from the New Forest, *Mi*, *glyphica*, and *Anea*, bring us to the end of the *Noctuæ*. I hope to complete my account of this collection with the *Geometræ*, &c. in another article.

(To be continued.)

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

May 5th, 1886.—Prof. J. O. WESTWOOD, M.A., F.L.S., Hon. Life-President, in the chair.

Mr. William Saunders, the President of the Entomological Society of Ontario, was present as a visitor.

The following were elected Fellows of the Society, viz. :—The Rev. E. N. Bloomfield, M.A., Mr. Frederick Fitch, Mr. A. J. Rose, and Mr. William E. Nicholson.

Mr. Jenner Weir exhibited a large and spiny lepidopterous larva which he had received some years ago from the late Andrew Swanzy, who obtained it in Western Africa.

Mr. Stevens exhibited a number of Coleoptera, recently obtained in the Isle of Wight, including *Apion Sorbi*.

Mr. Crowley exhibited four specimens of *Leto Venus*, a large moth belonging to the family *Hepialidæ*, from Natal.

Mr. Howard Vaughan exhibited a long series of *Cidaria immanata* from Kent, Surrey, and other southern counties, Perthshire, Isle of Man, Isle of Arran, the Orkneys, and Shetlands. He also exhibited *C. russata* from various localities in the South of England, and from Perthshire, Argyllshire, and the Islands of Arran, Lewis, and Hoy. Mr. Vaughan further exhibited varieties of *C. suffumata* from Dover and Darlington.

Prof. Westwood commented on the interesting nature of the exhibition of *C. immanata*, and stated that he had never before seen such a wonderful collection of varieties of a single species.

Mr. M'Lachlan exhibited for Mr. G. Lewis, living specimens of *Paussus Favieri* (Fairm.), lately collected in Portugal by Mr. Lewis.

The Rev. W. W. Fowler exhibited *Staphylinus latebricola* and *Quedius truncicola*, both from the New Forest.

The Secretary exhibited, for Mons. H. de la Cuisine, of Dijon, coloured drawings, life-size, of a variety of *Urania Cræsus*, and a variety of *Papilio Memnon*; and Prof. Westwood made some observations on them.

Mr. G. Elisha exhibited specimens of *Antispila Pfeifferella*, together with the cases, and the leaves mined by the larvæ.

Mr. J. W. Slater read a paper "On the Origin of Colours in Insects," in which he showed that the assertions of Mr. Grant Allen, that all brightly coloured insects were flower-haunting species, were incorrect; and that many brilliantly coloured insects were carnivorous. Mr. M'Lachlan said that the

physiological question in connection with colour had not been paid attention to; he thought that colour in insects was to a great extent dependent upon the circulation of fluids in their wings. The discussion was continued by Prof. Westwood, Mr. Goss, The Rev. W. W. Fowler, Mr. Jacoby, and Mr. Weir.—HERBERT GOSS, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

At the meeting held April 29th, there was a large attendance and several exhibits. Mr. May mentioned having visited the coast in search of larvæ of *Callimorpha dominula*, and found them in very great abundance. Mr. Anderson recorded the observation of ten or a dozen species of night feeding larvæ, on the young foliage at Walthamstow, and several members noted the appearance of *Lycæna argiolus* in fair numbers. Hybernated specimens of *Vanessa urticæ*, and *Io*, and *Pyrameis cardui* were also mentioned as having been observed in tolerable abundance, in various localities. A discussion on the life history of *Erebia epiphron* was held, but this species appears to be little known at present.

At the following meeting Mr. J. A. Clark exhibited some very beautiful bred specimens of *Anticlea derivata*, and a very interesting exhibit in the shape of red banded forms of *Coremia unidentaria*, bred from the same batch of ova, which produced the ordinary dark banded type. The specimens though so different in colour from the ordinary form, were nevertheless quite distinct from *Coremia ferrugata*, and prove beyond doubt that these two are good species.

On May 13th, several members recorded the appearance of *Lycæna argiolus* abundantly in various localities, some of the specimens captured being very large, measuring nearly $1\frac{1}{2}$ inches across the wings. The President commenting upon the records of so many specimens of hibernating butterflies combined with the abundance of this species, expressed an opinion that there seemed a probability of 1886 being a good one for Diurni.

At the meeting held 20th May, Mr. Hockett exhibited a very beautiful series of *Lycæna argiolus* from Loughton, and an interesting discussion took place on the life history of *Satyrus ægeria*. Its peculiar love of shady places was especially noted, being a characteristic very unusual for a butterfly. And several members mentioned the great abundance of the second brood, in the rides of the New Forest during August, the species there being far more intense in colouring than in those captured near London, though falling far short of the true *Ægeria* found in Southern Europe.—ERNEST ANDERSON, *Secretary*.

CLYDESDALE NATURALISTS' SOCIETY.

The eighth meeting of the season was held in the Society's rooms, 207, Bath Street, on Wednesday, 14th April, Mr. T. J. Henderson, President, in the chair. Mr. R. S. Sinclair was admitted as a ordinary member. Reference was made by Mr. James McGrouther to the list of the lepidoptera of the West of Scotland, which the Society intended publishing, and it was decided that the various lists prepared by the members should be revised for the purpose of being arranged for publication in the autumn. Mr. McGrouther exhibited a long and remarkable series of *Ypsipetes elutata*, shewing a great variety in colour and markings. He also exhibited bred specimens of *Tenio-campa opima*, regarding the rearing of which he made some remarks. Mr. George E. Paterson exhibited a beautiful collection of Ruffs (*Machetes pug-nax*), and read a short paper on the peculiarities and distribution of the species. Mr. James Lumsden, F.Z.S., laid on the table for inspection stems of rose bushes damaged by the Common Vole (*Arvicola argestis*), during the severe winter. The manner in which the stems were gnawed bore testimony to the straits to which the lower animals had been put during the cold weather for want of food. Mr. C. B. Cross showed specimens of some of the rarer lepidoptera of Clydesdale, and read some notes giving localities in the neighbourhood for the various species. Mr. T. J. Henderson read a very valuable and interesting paper on the "Eupitheciæ of Clydesdale," and exhibited specimens of the species found in the district; of this family he had himself taken no less than twenty species, and he believed that several of the other entomologists in the society had taken species not mentioned in his list. Seven of those mentioned by Mr. Henderson are not included in the list in the "Fauna and Flora of the West of Scotland." A paper by Mr. Bennett Browne was then read on the occurrence of large numbers of partridges (*Perdix cinerea*) in the town of Musselburgh, during severe weather. The birds were found in every part of the town, some in the most extraordinary places. One was found on the third-flat of a three-storied house, and a hen pheasant was caught in one of the streets. A lively discussion ensued, in which most of the member took part, but no satisfactory solution was given of the strange problem. Unless, indeed, the one given by a jocular member was true, who remarked that no doubt they had gone to look for "mussels," as they must have been hungry. Even this plausible explanation was rejected amid much laughter. A vote of thanks to the various gentlemen who had contributed to the proceedings brought a most interesting meeting to a close.—JOHN MACKAY, Secretary.

AN ENTOMOLOGICAL RAMBLE AT LINWOOD.

By JOHN MACKAY.

Perhaps there is nothing that pleases an entomologist so much as to spend a day collecting in a district which he knew was prolific in rare and curious species, and which he had long desired to visit. When I received a warm invitation from a gentlemen, residing in a district peculiar for the number of local forms to be found in its woods, and who was himself an experienced entomologist, I need hardly say that I accepted the kind offer very readily. I had long wished to visit Linwood, a beautiful place situated some distance from the busy little town of Paisley, but as the woods in the vicinity are strictly preserved, no one need visit them without permission from the proprietor, and this, unfortunately, I did not possess. Now, however, an opportunity was afforded me of spending a day in those delightful woods, and I looked forward to that visit with more pleasure than I could readily describe.

Saturday, 4th July, was a beautiful day, and in every way suitable for an enjoyable ramble in search of insects. On reaching Houston, where my friend resided, I found him ready to start, and an open carriage waiting to drive us to the scene of our operations. The drive was delightful. As we spun along a beautiful view could be had of the surrounding district, which lay bathed in a perfect flood of golden sunshine. The air was musical with the singing of birds, and a gentle hum of unseen insect life was ever in our ears. The country lay spread out like a map, with here and there a paper mill or factory, while some distance off Paisley lay hid in a dense cloud of smoke. The wood was in due time reached, and, with pockets well filled with nested chip boxes, we commenced work. For some time nothing of any importance was taken, except some very local micro specimens, but soon *Melanippe subtristata* began to appear rather commonly on the pine trunks. A few beautifully fresh specimens of *Larentia pectinitaria* were next captured, followed soon after by several of *Emmelesia alchemillata*. The fir trees received a good share of attention, but these produced nothing of any importance. Insects were unusually scarce, which was occasioned no doubt by the excessive heat of the day, making them sluggish and unwilling to fly. We beat the tree trunks as we went along, and by this means some more specimens of *pectinitaria* were netted, and a few *Cabera exanthemaria*. As we went along I could not help noticing the remarkable abundance of game in the woods; hardly a step could be taken without starting from cover a rabbit or a bird. Having now reached the end of the wood, we crossed a field where we found some rare micros, and entered another large wood. Suddenly, down in the hollow over the hill near by, we heard a tremendous noise,

very much worse than that produced by three German bands playing each a different tune at the same time, and on ascending the hill to see what occasioned it, we were told that it was an amateur band enjoying a pic-nic. Glad to get beyond earshot of the horrid noise we penetrated into the depths of the wood, and renewed our collecting. Insects were here a little more common, and *Boarmia repandata* and one specimen of *Miana arcuosa* were quickly added to our captures. *Cidaria inmanata* was also on the wing sparingly, but was difficult to net. We came across a little lake in the middle of the wood, completely surrounded by trees. Here we found freshly emerged specimens of that beautiful little pyrale *Hydrocampa stagnalis*, in great profusion. Several very handsome species of dragon-flies were flitting over the surface of the water, in the bright sunshine, like burnished streaks of red and blue light. It was altogether a beautiful sight. After filling almost all our spare boxes with specimens of *stagnalis* and dragon-flies, we resumed our way, much satisfied with our success and the lovely scene we had just witnessed. As we went along a good many specimens of *Emmelesia albulata* started up from the grass at our feet, and we took each a fair series of the species. Among our other captures we took some nice examples of *Pterophorus Bertrami*, and a great number of good tortrices.

Being by this time pretty well tired with our long ramble, we retraced our steps, and reaching the road found the carriage waiting to drive us back to Houston. We were not long in arriving at our destination, where we treated ourselves to a good wash, after which we did full justice to an excellent supper which was placed before us. On looking over my captures I found that I had taken over a hundred specimens, and, although, owing to several causes, I did not take many of the species which I had hoped to meet, I was far from dissatisfied with my first day's collecting at Linwood.

Some days latter I paid another visit to Linwood in the evening, and at honeysuckle, in my friend's garden, I took a large number of beautiful specimens of *Plusia C. aureum*, *Iota*, and *Chrysis*, along with other species such as *Dianthæcia cucubali*, &c.

Kingston, Glasgow.

NOTES ON MICROS.

By W. MACHIN.

I take this opportunity of jotting down some of the results of my collecting during the last few years, which have been devoted almost entirely to the Tortrices and Tinea. I am simply a working-man, and my collecting has been principally confined to a radius of about 20 miles around London, and

of course is only a small part of what might be accomplished by those who have time and means at their disposal.

In the latter part of last season, I collected a quantity of acorns containing larvæ from which I hope to rear *Juliana*. Some few years ago I bred a quantity of *Splendana* (many of which remained in the larval state for two years), from this fruit, but as this insect is not known to occur at Wanstead, where the acorns were collected, I expect they will prove to be *Juliana*. Of course there are several kinds of larvæ feed in acorns, but if they are put into large jam pots the coleopterous larvæ remain at the bottom and the lepidopterous crawl to the muslin at the top. These I remove to the glass cylinder cases hereafter described. Late in October I found the larvæ of *G. acuminatella* in plenty mining the large thistle leaves, and two full-grown larvæ of *Therinella* on the same plants. In December, I turned my attention gall collecting, in the hope of rearing the rare *Obscurana*. Gall collecting is certainly not profitable to follow, but it offers an inducement to the enthusiast to go out, and you breed a few species in fine condition that perhaps cannot well be collected at the time they appear.

This year I have bred 7 *Fimbriana*, an insect I was again glad to see, none having been reared for the last six years from the usual supply of galls. I am now turning my attention to stem collecting:—*Alisma plantago* for *Udava*; *Stachys sylvatica* for *Nigricostana*; roots of ragwort for *Æneana* and *Trigeminana*; *Daucus carota* for *Francillana* and *Dubrisana*; thistle-stems for *Cribrella*, *Pflugiana*, and *Cirsiana*; roots of *Artemisia vulgaris* for *Æneana*, *Simpliciana*, and *Alisella*; roots of *Centaurea nigra* for *Zagana*; and stems of wild parsnip for *Dilucidana*; from seed-heads of *Solidags virgaurea* I have bred *Curvistrigana*, *Subroseana*, *Implicitana*, and *Æmulana*; from *Aster tripoleum* for *Tripoliana* and *Affinitana*; from *Arctium lappa* for *Badiana*; from *Daucus carota* for *Rufillana* and *Depressella*; from large thistle heads for *Cana*; from yarrow for *Dipoltana* and *Smeathmanniana*; from *Centaurea nigra* for *Stramineana*; from ragwort for *Nigromaculana* and *Senecionis*; besides a large number of *Tinea* all from seed heads.

I find nothing answers better for rearing lepidoptera than flower-pots or saucers filled with fine mould mixed with silver sand, a glass ring about two or three inches deep, to fit just inside the rim and secured with putty. Over the mould I put a supply of rotten wood (willow I find best), and cover the cylinder with gauze. I have a number of these varying in size from 4 to 12 inches in diameter, with rings from 2 to 9 inches high. In these cages many species can be fed on growing plants, add they should be kept fully exposed to the influences of the weather.

Many of the tree-feeding species I rear in the cages recommended by Dr. Knaggs some years ago, as I find they answer very well.

REVIEW.

THE LONDON CATALOGUE OF BRITISH PLANTS

(EIGHTH EDITION.)

To the botanist, whether amateur or professional, the mere collector of specimens or the earnest student of our indigenous flora, there is no more indispensable hand-book than "The London Catalogue of British Plants." The aim and scope of the work as set forth on the title-page, makes it adapted for marking desiderata, for making exchange betwixt collectors, and for furnishing a guide as to the comparative rarity of species. In working up a list of plants occurring in a local district, or as an index to a herbarium, it is invaluable, and should be in the hands of everyone who studies accuracy in the arrangement of their collections. Although to the outsider it seems a mere list of names, cranky and jaw-breaking in the extreme, followed by certain cabalistic figures, yet to the initiated it is brimful of interest and instruction. Comparing the present with the last (Seventh) Edition, one is struck with the enormous apparent increase in the number of plants, the total being raised from 1680 to 1858, a leap of 178 in twelve years, makes one stare and almost lose faith in evolution, and think that some special creation has been at work. But, when the figures are analysed, it seems that flora has not been quite so fruitful, nor the earth born such a multitudinous progeny. In the old edition there were nearly 100 species printed in an appendix, as aliens, casuals, &c, and as having no legitimate claim to be included in a list of British plants. But now some 65 of these are printed in the body of the work, as having by long residence established their claim to Naturalisation. Then the vexed question as to what constitutes a species, and what should only be regarded as a variety, has been liberally dealt with in the present issue, and a goodly number of what were formerly printed as varieties are now raised to the rank of species, and have a number to themselves. But after both these elements are removed, there is still evidence of an immense amount of hard work done by field botanists, which shows the impetus given to this branch of science in recent years. With such a circumscribed area, already so well explored it was not to be expected that many absolutely new plants should be discovered. And where new species have been met with, it has not usually been in sequestered nooks, "wasting their sweetness on the desert air" where they had been overlooked—unseen by prying botanists of former generations; but they have been found in the untrodden paths of botanic lore, amongst the obscure and neglected orders such as the *Potamogetons* and *Charas*, or else the variable and critical genera like *Rubus* or *Hieracium*. But it is in the records of the general distribution of native flora, that there is evidence of

of the most persevering work having been accomplished. This is so extensive and interesting a branch of the subject, that it desires more extended notice than can be comprised in a brief review. A decided improvement is the numbering of the genera, which now amounts to 542 and a complete index printed on the cover is a distinct advantage. Five new orders are added, and the arrangement both of orders and species are considerably altered which makes it rather puzzling at first, especially as it does not follow either of the two more popular floras which are in most general use. But, undoubtedly, the most irritating alteration is the wholesale change in the nomenclature, it is all very well to say that a rose by another name would smell as sweet, but it is peculiarly aggravating just when one has got nicely familiar with the names as well as the forms of flowers, to find that you must unlearn the old patronymies and call them by a new cognomen. Doubtless this is all right and proper from a scientific point of view, but it does seem regrettable from the popular aspect, particularly when the name was easy and appropriate, to find *Aira* transformed into *Deschampsia*, *Cynodon* to *Fibichia*, *Triodia* to *Sieglingia*. To the more youthful botanists whose minds are facile and receptive, such changes are easily mastered, but, to the aged veteran these ruptures in the continuity of associations are like severing the ties of old friendships, causing a painful wrench. Several blanks are noticeable, such as the genus *Agrimonia* having no census numbers attached, but withal the new edition will be welcomed as a boon by all botanists.

NOTES AND OBSERVATIONS.

EXCEPTIONAL PROCEEDINGS OF A FEMALE *TEMPLI*.—Some months since Mr. Harrison, of Barnsley, kindly sent me a female *Dasypola templi*, which I placed outside under cover, during the exceptionally severe winter we have had. It was buried in snow for more than two weeks, the extreme cold continuing quite up to the time it should have deposited its eggs (say about the 20th to the 24th March), and it did not move until early in April. On the 8th day of April it deposited 72 eggs, straggling upon the gauze which covered the flower-pot. In this flower-pot was planted *solid full* with parsnips, which had begun to grow, the roots being kept about one inch above the soil. On the 16th, 17th, and 18th of the month she deposited 238 more eggs, making a total of 310; these also were all scattered about and adhering to the gauze covering, not a single egg being upon either leaves or roots of the parsnips! Why she should have ceased to lay on the 8th and then commenced again on the 16th, and kept on laying for three days, is a puzzle to me, and is what I think exceptional. I shall be pleased to hear if others

have observed such a case. It must be borne in mind that there was no material change in the weather or temperature in the interval between the 8th and the 18th of April. The first of the eggs deposited are now far advanced in colour, but it is quite certain that the last lot can never overtake them, and so I expect to breed a continuous brood during August and September; hitherto I have always had them in the perfect state about the 12th of August.—C. S. GREGGSON.

NOTES ON THE ORKNEY (HOY) LEPIDOPTERA taken by Mr. Curzon, during the season of 1885 (*continued*). During last summer Mr. Curzon worked the *Selene* plants at Hoy with the especial object of breeding *Dianthæcia*, and forwarded the flowers to me here (the *Dianthæcia* have not yet emerged), but during the week several ordinary forms of *Eupithecia venosata* emerged which had fed upon the flowers. On reference to our friend Jenner Weir's interesting paper upon the "Lepidoptera of the Orkney Isles," page 1, vol. xv. *The Entomologist*, I found this was the correct form. What then was my surprise to find several specimens of a new form of *E. venosata* in my breeding boxes yesterday and again to-day. Varieties I had only seen a single specimen of from Wales before, so distinct and so well defined in colour, some specimens so large in expanse and breadth that I looked twice before I said, no doubt extraordinary variety of *venosata*! These specimens are yellow ochre to brown ochre coloured, distinct, no running into the ashy greys, but some are olivaceous ochre. They vary in size, from smaller to much larger than the ordinary coloured specimens which I have bred from the same lot of flowers. There are still a few to emerge, if they differ when they appear I will send a further note, in the meantime I propose for this most interesting form, the name of *Eupithecia venosata* v. *ochracea*.

THE DEATH'S HEAD AT HARTLEPOOL.—A fine female of *Acherontia atropos* was given me on the 22nd May, by Mr. Holman, which had been taken on board of one of the fishing boats. It is in fair condition and has evidently deposited all its ova. A second specimen was given to my friend Mr. Gardner, by the Mayor (Dr. Rawlings,) his daughter had found it on the rocks two days later than the other. It also is in fair condition.—J. E. Robson.

LASIOCAMPA ILICIFOLIA.—The Rev. John Hellins, The Close, Exeter, desires the larvæ of this species—for description in The Ray Society's issue of Mr. Buckler's drawings. It is little known, and some mis-apprehension appears to exist as to the date at which it should be looked for. It is well, therefore, to inform those who are endeavouring to assist Mr. Hellins, that Mr. Buckler figured the larva on 9th July, 1858. It should, therefore be carefully looked for during this month and the beginning of next. Mr. Hellins will return the imago if reared.

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WOODLAND RAMBLES IN LINCOLNSHIRE.

By H. WALLIS KEW, F.E.S.

AT nine o'clock on the 23rd April, 1886, a friend and I started out on a ramble, during which Haugham and Maltby Woods were to be visited. While walking along the road numerous specimens of *Aphodius punctatosulcatus* were noticed flying over horse-dung on the road in the hot sunshine. Under a large stone at Kenwick Lodge *Bembidium littorale* was noted. Here we left the road, but had a considerable distance across the fields to walk before the woods could be reached. A heap of bricks near the pathway was examined, among the mollusca here *Zonites glaber* and *Helix rotundata* were both plentiful; and one specimen of *Cochlicopa lubrica* was taken—this little mollusc crawled about actively in the chip-box in which it was placed; there was also a colony of yellow ants (*Formica flava*), which on being molested were busily engaged in carrying away their pupæ. *Harpalus ruficornis* was captured. Under a plank in a ditch a single specimen of *Limnæa truncatula* was found.

While passing Maltby Wood on our way to Haugham Wood we called in at the central ride and found the field slug (*Limax agrestis* v. *sylvatica*), and several of *Helix hispida* under a large log of wood. Haugham Wood being reached we walked round its border, so that Grisel bottom, one of the most beautiful spots in the district, might be reached before very late in the day. Under a log just inside the wood a very young yellowish specimen of *Arion ater* was found. Going a little further we visited Haugham pit (an old disused chalk-pit adjoining the wood), under a large stone here were *Clausilia rugosa*, *Zonites glaber*, *Vitrina pellucida*, and the "ever present" *Helix rotundata*. On the banks of the pit, *Zonites nitidulus*, *Helix arbustorum* and *Helix nemoralis* v. *libellula* 00000 were taken, together with the common sun beetle (*Amara plebeia*). Leaving this pit, and after making notes respecting a hibernated peacock butterfly (*Vanessa io*) seen, and *Meligethes*

rufipes in the flowers of a primrose, we arrived at a small quantity of clear water, in which the little water-beetle (*Hydroporus palustris*) was seen, and *Limnæa truncatula* appeared to be plentiful on the mud at the bottom. Presently a pond was reached, on a log of wood in which were two specimens of *Helophorus aquaticus*, and on the surface of which whirlwigs (*Gyrinus natator*) were swimming. At length we arrived at Grisel-bottom. Here we reclined upon a dry bank, with a good view of this beautiful post-glacial valley, to lunch—the scene was a lovely one, the mid-day sun was shining as brightly as it could do, considering it was yet only April; the air was full of small insects, representing various orders; near our feet a humble-bee fly (*Bombylius medius*) was hovering over the primroses, and a few yards before us was a large patch of *Viola hirta* in full flower. The following coleopterous insects were seen flying in the sunshine in this valley: *Helophorus aquaticus*, *Sitones lineatus*, *Hypera nigrirostris*, *Meligethes rufipes*, *Anchomenus parumpunctatus*, and *Silpha thoracica*. Under a prostrate branch *Clausilia laminata* and a very young garden slug (*Arion hortensis*) were found. On the ground in the bottom of the valley dead and bleached shells of *Cyclostoma elegans* and *Cochlicopa lubrica* were picked up. *Meligethes rufipes* was common in the flowers of *Potentilla fragariastrum*.

On leaving Grisel-bottom, we walked through Haugham Wood in a homeward direction. We searched for shells under a fallen tree, which Mr. W. D. Roebuck, Editor of the "Naturalist," during his stay in Lincolnshire had examined only a few days previously; here we found *Zonites glaber*, *Z. crystallinus* and *Helix rotundata*. *Carychium minimum* was found under this tree by Mr. Roebuck. Going a little further a group of several prostrate trees produced *Zonites glaber*, *Z. purus* v. *margaritacea*, *Helix rotundata* and *Limax lævis*. A specimen of the lady-bird (*Coccinella variabilis*) was also noticed. On turning over another prostrate tree about a dozen specimens of *Clausilia laminata* and several *C. rugosa* were found. Leaving Haugham Wood a little time was spent in Maltby Wood, *Arion subfuscus* being found under a log.

On Saturday, the 1st May, Mr. V. T. Crow, one of the members of the "Louth Naturalists' Society," and myself left Louth for the woods, at 2 o'clock in the afternoon. Leaving Maltby Wood behind, we visited a wood known as "Haugham Pasture" first of all. By the roadside near the wood *Zonites glaber*, *Helix rotundata*, *H. hispida*, and *Limax agrestis* type and v. *sylvatica* were noted under a log. In Haugham Pasture a small prostrate hawthorn trunk was turned over, *Clausilia laminata*, *Helix rotundata*, *Zonites glaber*, and *Vitrina pellucida* were noticed, and seated on the bark on the under side of the trunk was a single specimen of *Barynotus mærens*,

Fab. The Rev. W. W. Fowler, who kindly named a specimen of this weevil for me, says in his letter—" *B. mærens* is rather a good beetle, I have only found it in one locality, where it is rather plentiful." Under some fallen oak branches, a young specimen of *Arion ater* v. *rufa*, L. (about as big as *Arion hortensis*) was found, together with another very young *Arion ater*, agreeing with v. *pallescens*, Moq. in its present condition, but which would probably have turned *rufa* when it became adult. Next we came to a pit on the border of Haugham Pasture, known to us as the "marbled-white pit," because it is one of our localities for *Melanargia Galatea*. On the chalky soil at the top of this pit, violets (*Viola hirta*) were plentiful; down in the bottom of the pit a single specimen of *Helix ericetorum* was found, and a dead shell of *Helix hortensis*, with a band formula of (12)045 was picked up. Mr. T. D. A. Cockerell, to whom I submitted the specimen of *H. hortensis*, wrote me—"the band-formula (12)045 is new to Britain, it was first mentioned by E. Von Martens as a Continental variety." This usually common *Helix* is curiously scarce in this neighbourhood, and I believe it is yet unrecorded for Lincolnshire; at least it was not recorded for vice-counties 53 and 54 (North and South Lincoln) in the "Census of the authenticated distribution of British Land and Fresh-water Mollusca," by Taylor and Roebuck, read before "The Conchological Society," in April, 1885; this may be accounted for, perhaps, by the fact that the County of Lincoln has not yet been properly worked. A log of wood was turned over in this pit, *Helix arbustorum*, *H. rotundata*, *Zonites glaber*, and *Z. cellarius* being the result.

Passing across an arable field Maltby Wood was reached. A log which had formerly done duty as a gate-post was turned over, and produced *Helix arbustorum*, *Helix rotundata*, *Limax agrestis* type, and *Clausilia rugosa*. On the trunks of some oak trees by the side of the ride in the wood, one female and several males of the common little moth *Diurnea fagella* were noticed, and afterwards in the wood a male was taken on the wing. Under the moss at the roots of an oak, the tree slug (*Limax arborum*) was found, and just before leaving the wood *Arion subfuscus* was taken from beneath some pieces of wood, which were going to be used for the purpose of mending the fence. Leaving Maltby Wood we walked home by the London Road, visiting a disused chalk-pit by the roadside on our way, here were noticed *Helix caperata* and *rotundata*; the garden-slug (*Arion hortensis*) and the field-slug (*Limax agrestis*) were common under the loose pieces of chalk. After we had left this pit and noted the little beetle *Trechus minutus*, under a stone by the road-side we made the best of our way homewards.

LEPIDOPTERA TAKEN OR SEEN IN THE
NEIGHBOURHOOD OF BOCKLETON,

1885.

CONTRIBUTED BY MISS PRESCOTT DECIE AND MISS N. PRESCOTT DECIE.

IMAGINES.

n. numerous; *s.* scarce; *v.s.* very scarce.

M. artemis, <i>s.</i>	A. ulmata, 1
G. c-album, <i>v.s.</i>	C. brumata, <i>v.n.</i>
V. urticæ, <i>n.</i>	O. dilutata, 2
V. Io., <i>n.</i>	Y. elutata, <i>s.</i>
P. atalanta, <i>n.</i>	E. albulata, 1
P. cardui, <i>s.</i>	M. montanata, <i>v.n.</i>
P. ægeria, <i>v.s.</i>	M. fluctuata, 2
E. janira, <i>n.</i>	A. badiata, 1
E. tithonus, <i>s.</i>	C. propugnata, 1
E. hyperanthus, <i>n.</i>	C. ferrugata, 4
C. pamphilus, <i>n.</i>	C. bilineata, <i>v.n.</i>
P. phlæas, <i>s.</i>	S. dubitata, <i>s.</i>
L. icarus, <i>s.</i>	C. miata, 1
L. argiolus, <i>n.</i>	C. russata, <i>s.</i>
R. rhamni, 1	C. suffumata, 3
P. napi, <i>n.</i>	C. fulvata, 2
P. rapæ, <i>v.n.</i>	C. pyraliata, 1
P. brassicæ, <i>n.</i>	E. mensuraria, <i>n.</i>
H. tages, <i>s.</i>	E. palumbaria, <i>n.</i>
H. sylvanus, <i>s.</i>	T. batis, 1
H. humuli, <i>s.</i>	A. rumicis, 1
U. sambucata, <i>s.</i>	B. perla, 1
R. cratægata, <i>v.n.</i>	L. pallens, 1
P. syringaria, 2	C. arcuosa, 2
P. pilosaria, 2	X. polyodon, <i>n.</i>
T. lactearia, 1	G. trilinea, 1
A. bisetata, 2	T. pronuba, <i>n.</i>
A. aversata, 1	N. augur, <i>n.</i>
C. pusaria, <i>n.</i>	N. plecta, 1
N. pulveraria, 2	N. festiva, 1
A. grossulariata, <i>s.</i>	N. baja, 1

T. gothica, <i>v.n.</i>	Taken at willow blossom.	A. lithorhiza, 2
		A. urticae, 1
T. rubricosa, 2	do.	P. pulchra, 1
T. stabilis, <i>v.n.</i>	do.	P. gamma, <i>n.</i>
T. munda, 2	do.	A. tragopogonis, <i>n.</i>
T. cruda, <i>v.n.</i>	do.	G. libatrix, <i>n.</i>
S. satellitia, 7	do.	M. maura, 2
A. nebulosa, 1		

REARED FROM LARVÆ TAKEN AT BOCKLETON.

S. populi, 2	C. miata, 1
A. menthastri, 1	C. spinula, 3
E. lanestris, 1	P. bucephala, 1
E. syringaria, <i>n.</i>	N. camelina, 1
O. bidentata, 4	A. megacephala, 1
A. prodromaria, 1	A. rumicis, 1
C. pusaria, 2	M. brassicæ, 1
N. pulveraria, 1	N. augur, 2
A. grossulariata, 2	N. festiva, 3
H. rupicapraria, <i>n.</i>	T. gothica, 2
H. leucopheararia, 2	T. instabilis, 3
H. progemma, <i>n.</i>	T. populeti, 3
A. æcularia, 7	T. stabilis, 3
O. dilutata, 2	X. silago, 1
L. didymata, 2.	X. ferruginea, 1
E. sobrinata, <i>n.</i>	C. trapezina, 1
A. derivata, 1	N. typica, <i>n.</i>

LARVÆ.

G. c-album, <i>v.s.</i> , hop	H. rupicapraria, <i>n.</i> , hawthorn and blackthorn
V. io, <i>n.</i> , nettle	
S. ocellatus, 1, willow	H. progemma, <i>s.</i> , willow
O. pudibunda, <i>n.</i> , hop	H. defoliaria, <i>n.</i> , oak, &c.
O. antiqua, 1, rose	C. brumata, <i>v.n.</i> , „
D. coryli, 1, nut	O. dilutata, <i>s.</i> , hawthorn
P. populi, 1, birch	L. didymata, <i>n.</i> , primrose
O. potatoria, <i>s.</i> , grass	E. sobrinata, <i>n.</i> , juniper
E. fasciaria, 1, Scotch fir	Y. elutata, <i>n.</i> , willow catkins
P. pilosaria, <i>n.</i> , elm, oak, &c.	A. derivata, 2, rose
A. betularia, a few on hop	C. miata, 1
C. pusaria, <i>n.</i>	C. spartiata, a few, broom

A. megacephala, 1, aspen

X. ferruginea, 2, elm

N. augur, 2, sallow blossom

C. trapezina, s., oak

X. silago, 1

The spring was very cold, and before we left home at the end of April we had taken but few moths, except at the sallow blossom. We returned on May 26th, but even then insects were not very plentiful. July was hot, and butterflies were numerous during that month, but later in the summer they became scarce, the weather in August and September being very dull and cold. We "sugared" a few times, but without taking any moths. Larvæ were very scarce all the year, and though we spent much time, during June, searching and beating for them, we did not take so many as usual. In the autumn we were fairly successful in pupa digging, obtaining nearly 100 pupæ. Most of these were found at the roots of oak trees, but some were taken also from the roots of birch, beech, and aspen. We do not know if there are any good species amongst them, only two or three having emerged as yet.

SIX MONTHS' WORK AMONG THE TORTRICES AND TINEITES.

By ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

JULY.

The number of Micro-lepidoptera I have noticed in July is very large, and, in fact, I may say the season is now at its height for these small moths, and those who desire to become acquainted with the imagines of the tortricina and tineina have every opportunity of doing so. In addition to many of the species which occurred last month, and which may still be met with, several others make their appearance in July. Among these are the pale ochreous *Tortrix icterana*; the brownish northern moor-haunting *Tortrix viburnana*; the local *Tortrix dumetana*, which must be sought for in Monk's Wood, in Huntingdonshire; the brown-grey *Tortrix crategana* (*Lozotenia roborana* of Stainton), with dark brown markings on the fore wings, occurring at West Wickham, and the honeysuckle-loving *Tortrix xylosteana*. The ground colour of the fore wings of this last named moth is pale brown. The central fascia is narrow at the point where it commences on the costa, but afterwards gets gradually broader; it is reddish-brown in colour, edged with yellowish. There are two reddish-brown blotches just beyond the costal spot; one at the anal angle of the wing and the other at the apex. The basal patch is in

the form of a deep brown streak running obliquely from the base of the wing to the inner margin. The palpi are a little longer than the head and the fore wings twice as long as broad, with the costal margin abruptly arched at the base. Specimens vary much in size, some expand very nearly an inch, others only two-thirds of an inch. I find them about oak trees as well as honeysuckle, and the moth is, I believe, generally common.

The abundant *Batodes angustiorana* may be found about most trees in July and August. The fore-wings are more than twice as long as broad, with regularly arched costal margin and rounded hind margin. The male and female vary somewhat in appearance; the former has pubescent antennæ and greyish ochreous fore-wings with brown markings, of shade varying from simply brown to black brown. The costal spot is large and extends to the anal angle; in colour it is black-brown. The central fascia is slender at its commencement on the costal margin, sinuous, and gradually widens to the inner margin; its colour is brown. The female moth has reddish ochreous fore-wings, marked with reddish-brown. The female moth has reddish ochreous fore-wings marked with reddish-brown. The costal spot is reddish-brown, and extends nearly to the anal angle; a pale yellow spot on the costa comes between it and the central fascia; this last is reddish-brown. There is an oblique reddish-brown streak extending from the inner margin in the place of the basal patch. The male moths are rather over half-an-inch in expanse; the females sometimes as much as three-quarters of an inch.

On the trunks of poplar trees in July and August may sometimes be seen a little pale grey tortrix, mottled with dark grey, and with a blackish apical spot. This is supposed by many entomologists to be a variety of *Grapholita nisana*, but some—among which are Mr. Stainton—consider it distinct and term it *cinerana*. I think myself it may fairly claim to be a separate species, the typical *nisana* has a dark brown basal patch and the grey ground colour of the fore-wings is somewhat tinged with ochreous. Moreover, the specimens are on the average smaller than *cinerana*, some of the latter expanding fully two-thirds of an inch, while *nisana* never exceeds $6\frac{1}{2}$ lines. I have never found *cinerana* among willows, but *nisana* may often be found about these dwarf willows, even more often I think than on poplar trunks.

The variable *Pædisca solandriana* occurs in this month, and the following one among hazel, birch, and other trees. The fore-wings are thrice as long as broad, with an arched costal and truncated hind margin. In size they expand a trifle over three-quarters of an inch. Some specimens are dark reddish brown, with a conspicuously white triangular blotch in the centre of the inner margin, extending as far as the middle of the wing; others are pale reddish brown, with the basal patch outlined with darker, and the central fascia

also darker than the ground colour; others are pale greyish ochreous, with a large dark brown blotch on the inner margin. The palpi are longer than the head, and densely clothed with scales.

The glossy ochreous-coloured *Catoptria Howenwarthiana* is now generally common among thistles. It must not be confounded with *C. scopoliانا*, which appeared last month and is still out. The latter has the lower half of the basal patch pale ochreous-brown, while in *Howenwarthiana* this portion is pale reddish-brown. The latter species has the reddish-brown central fascia obscurely defined; both have pearly-edged ocelli. They are both about of a size (8 or 9 lines), but *Howenwarthiana* is, if anything, the smaller of the two.

We are sure to find the exceedingly variable *Peronæa variegana* in rose gardens and about bramble-covered hedges throughout July and August. Generally half the wing is white from the base to the middle, and the other half dark grey. In some specimens the white basal portion is less pure than in others, and is marbled with grey, and has a triangular dark grey spot not far from the base; the other half of the wing brown, marked with darker shades; then again in other specimens the basal half is cream-coloured instead of white, and in others the dark grey apical half is blotched with paler. Even this does not exhaust the list of varieties, for we find some specimens uniformly dark grey with blackish markings, and some have the fore-wings of an ochreous ground colour with two black blotches, one of which is situated on the inner margin, not far from the base, and is triangular in form, the other is very irregular in shape, and is in fact the first half of the central fascia running up into and becoming confluent with the dark costal spot.

Entomological visitors to the New Forest should look out now for the ochreous *Peronæa aspersana*, which occurs there among salad burnet (*Poterium sanguisorba*) and common dropwort (*Spiræa filipendula*), while those who on the other hand go to the north are sure to see the reddish-brown *Peronæa Caledoniana* on the heaths and moors. Both species are out till September.

Among sallows we may find *Sarrothripa revayana*, *Ditula semifasciana*, *Penthina capræana*, *Grapholita campoliliana*, and *Euchromia rufana*. The first-named is somewhat local, and is very variable. Some specimens are greenish and others ochreous-grey. The fore-wings are elongate with abruptly arched costal margin and obtuse apex; the antennæ are filiform and the palpi much longer than the head. *Ditula semifasciana* is grey with the central fascia obliquely placed, not straight or nearly straight as in *revayana*; it is also a smaller insect expanding about nine lines, while *revayana* measures as much as eleven lines or an inch. *Semifasciana* occurs in the South of

England, where it is much commoner than *revayana*. *Penthina capreaana*, which may be taken in Epping Forest, is the same size as *semifasciana*, but has the apical third part of the wing white and the basal two-thirds brownish. *Grapholita campoliliana* is smaller (five or six lines) than either of the others, and is much commoner. The fore-wings are white with grey basal patch and central fascia, and bluish ocellated spot. The extreme tips of the wings are rust colour. *Euchroma rufana* occurs in the New Forest and some others but not commonly. It has glossy pale ochreous fore-wings, twice as long as wide, with costal margin abruptly arched at the base and slightly concave in the middle, and with slightly produced apex and somewhat oblique hind margin. The costal margin is broadly whitish as far as the middle, and beyond it with an obscure grey cloud of a triangular shape in the centre. The inner margin has also a grey blotch beyond the basal patch. This species may be looked for until quite late in the autumn.

The pale primrose coloured *Argyrolepis badiana* is common in July among burdock. It has a conspicuous chocolate-coloured blotch, reaching from the middle of the inner margin as far as the centre of the wing, and there are also other markings of an ochreous and chocolate-brown colour. The hind-wings differ in colour from the fore one being greyish brown. These are all the tortricine imagines I have space for now. Many of those mentioned last month are still out.

The only larvæ I have room for are *Peronea ferrugana* (pale green, with brown head), in puckered birch leaves; *Coccyx vacciniana*, on bilberry; and *Eudopisa nigricana* (yellowish-white, with pale brown head and greenish-grey spots), in pea-pods.

I last month gave prominence to the tortricina, and described in some detail the characters of this group. It was my intention in the present number to speak principally of the tineina, and say something of the classification of these small moths, but I have taken up so much space with the tortricines, that I have not much more room left. However, I will, for the sake of those young naturalists, just commencing the study of the micro-lepidoptera, say something about the characters of these tiny moths, even at the risk of having to omit a large portion of the list of species occurring in July.

There is little or no difficulty in distinguishing a tineite from the other small moths; the narrow wings with their long fringes are quite sufficient to identify it at once. It is no great task either to discover at least the family to which a species belongs. "The development of the palpi," to quote from the *Manual*, "and their variety in form and structure, offer most tangible grounds for separating the greater number of the genera." "Indeed," Mr. Stainton goes on to say, "if the student will look at the head of a species to

see whether it is hairy or smooth, if he will then notice the palpi, whether the maxillary palpi are developed and to what extent, and whether the labial palpi are slender, ascending or drooping; whether the second joint is densely clothed with scales, or bears a long protruding tuft; and if he will further notice the form of the hind-wings, which are either well rounded or very pointed, or indented toward the tip, he will be perfectly surprised to see how easily he will arrange these insects into genera by their structure."

In the Tineidæ, the labial palpi are short and thick. For an example of this family take the little *Ochsenheimeria Birdella*, which we may find in meadows in July. The larvæ live from the beginning of February to the end of May in grass stems. Two other species also occur now, viz. *bisontella* and *vaculella*. The first-named occurs in heathy places, the other is said to frequent houses in some places. They are all three little greyish-brown moths, about half-an-inch or less in expanse. *Birdella* is the largest of them and has the antennæ much thickened with scales as far as the middle; *bisontella* has the antennæ only very slightly thickened, whilst in *vaculella* they are perfectly simple.

The common "clothes moth" (*Tinea pellionella*), may be taken as an example of the genus *Tinea*. Inspecting one with a lens you will see it has a hairy head, and you will notice that the maxillary palpi are folded, while the labial palpi are cylindrical and hairy. The fore-wings are oblong and ovate, and the hind ones ovate and fringed. The species of this genus occurring in July are: *Tinea imella* (fore-wings with a transparent spot on the disk, shining fuscous), *T. ferruginella* (do., dark fuscous), *T. tapetzella* (basal half black, apical half whitish), *T. caprimulgella* (dark fore-wings, with large whitish marginal spots, occurs about rotten wood), *T. merdella* (occurs chiefly in Lancashire, fore-wings nearly unicolorous, but with a short blackish streak from the base near the costa), and *T. simpliciella* (fore-wings violet brown with yellowish tinge, hind-wings greyish purple, occurs at Dover and Mickleham). One or two others also occur.

In the *Hyponomeutidæ*, of which the well-known *Hyponomeuta padella* may be taken as an example, the maxillary palpi are altogether absent, and the labial palpi short. The head is rough and the fore-wings elongate.

In the genera *Swammerdamia* and *Scythropia* the head is rough. In the first-named the palpi are porrected, in the other they are drooping. The grey violet-tinged *lutarella* may be taken as an example of the former and the white fuscous dotted *cratægella* is the only British representative of the latter. In the genera *Hyponomeuta*, *Anesychia*, and *Prays*, the head is smooth and the palpi reflexed. Besides the well-known little ermine moth (*Hyponomeuta padella*), which we are sure to see in plenty about every

hawthorn hedge, we may find *H. plumbella* and *H. evonymella* among spindle. The first-named has four rows of black dots arranged longitudinally, the second has three rows; both have white fore-wings. The little black and white *Prays Curtisella* occurs among ash. In the *Plutellide* the head is rough and the labial palpi has a projecting tuft of scales beneath the second joint. *Plutella porrectella*, the larvæ of which feeds on dame's-violet, may be taken as an example of this family; the moth has whitish fore-wings streaked with ochreous, and a fuscous-coloured hind margin spotted with black.

I am unable this month from want of space to give further descriptions, but I will just conclude with a list of a few species I take or look out for in July: *Cerostoma sequella*, among willows; *C. vittella*, on elm; *Harpigteryx harpella*, among honeysuckle; *Orthotelia sparganella*, about bur-reed; *Phibalocera quercella*, about oak, apple, and hawthorn; *Depressaria costosella*, about furze bushes; *D. liturella*, on knapweed; *D. conterminella*, in osier beds; *D. angelicella*, among *angelica*; *D. ocellella*, larva on willows; *D. applanella*, beaten from thatch, larvæ in folded umbelliferous leaves; *D. albipunctella* occurs sometimes among thatch, but is rare about Cambridge; *D. chærophyllivorella*, larva occasionally in umbels of *Chærophyllum temulentum*; *D. nervasella* larvæ in umbels of *Ananthe crocata*; *Glyphipteryx thrasionella*, among rushes. These are only a small portion of the tineina I observe in July, but it is impossible to give anything like a complete list in a magazine article.

Mill Road, Cambridge.

THE ORIGIN OF APTEROUS FEMALES.

By JOHN E. ROBSON.

This subject, introduced by Mr. Anderson, is a most interesting one and worthy of more attention than it has received. Perhaps the difficulties of such problems deter many from entering upon their discussion, few caring to express opinions that may be very far from the truth. But it is surely better to begin in error and work out a true theory, than never to discuss a subject lest one's blunders are ridiculous, or ignorance very gross. I have often regretted that Lepidopterists as a rule were less scientific than Coleopterists. Lepidopterists can name their captures, that end of a young collector's ambition, by a careful examination of the wing markings. Coleopterists *must* know something about structure before they can accomplish this. *Students* of Lepidoptera must study details, but collectors need not

necessarily, and as a rule do not. The merest tyro in Coleoptera must examine the legs, antennæ, &c. of his captures in detail, as well as the markings on the elytra. It is a decided step in advance to discuss such questions as the "Origin of Apterous Females," and I am not entering into the discussion with any positive knowledge on the subject, but it is not a new one with me, and I made a suggestion on the subject in the Y.N. for December, 1883 (see Y.N. Vol. v. p. 16.) My main reason for entering into the discussion so early is to call attention to what appears to me to be an error in both the papers that have appeared, viz. that the primary cause has been the *crippled* wings of some progenitors of these species. I think we may take it for granted that the axiom "like produces like" does not necessarily apply in such a case as the non-expansion of the wing of a butterfly or moth. Mr. Darwin produces many illustrations to show that the *disuse* of an organ will diminish it both in size and power, but he says "The evidence that accidental mutilations can be inherited is at present not decisive" (*Origin of Species*, 6th Ed., p. 108), nor am I aware of any subsequent illustrations confirming the idea. Disuse, however, will unquestionably cause a diminution in size and power of any organ, and the females of the four genera Mr. Anderson refers to (*Phigalia*, *Nyssa*, *Hybernia*, and *Cheimatobia*), are not by any means the only insects that are without wings. Many beetles are in the same state and some actually have rudimentary membranes, below elytra that are joined at the suture, and could not possibly be raised for flight.

I would take it for granted then that the reason why these species have rudimentary wings only, is because it was to their advantage not to use them, and that those who used them least were least likely to transmit large and strong wings to their descendants. The remarkable case, so often quoted, of the beetles of Madeira, may be repeated here, though it is probably well known to most of the readers of the magazine. Mr. Wollaston discovered the remarkable fact that in Madeira, an island much visited by strong winds, there is the enormous proportion of 220 out of 550 species of beetles inhabiting the island that cannot fly, and of "twenty-nine endemic genera, no less than twenty-three have all their species in that condition." Here, at Hartlepool, and no doubt everywhere else on the coast, the sands and sand banks are about the best possible ground for collecting coleoptera. With a west wind, that is from the land to the sea, thousands of beetles are blown on to the beach and into the sea. Many, of course, are drowned, but those that fall on the sand endeavour to make their way back again to the banks, and may be picked by the collector. In Madeira, a comparatively small island, subject to strong winds, the proportion of wingless beetles is too great for it to have been accidental. Mr. Wollaston also pointed out "that certain large

groups of beetles, elsewhere excessively numerous, which absolutely require the use of their wings, are here almost entirely absent." His conclusions are as follows: "These several considerations make me believe that the wingless condition of so many Madeira beetles is mainly owing to the action of Natural Selection, combined probably with disuse. For, during many successive generations, each individual which flew least, either from its wings having been ever so little less perfectly developed, or from indolent habit, will have had the best chance of surviving from not being blown out to sea; and, on the other hand, those beetles which most readily took to flight would oftenest have been blown to sea and thus destroyed."

If then this much be admitted, that the rudimentary wings of those insects that have them in this state, is owing to disuse; in order to find the cause, we must endeavour to show that it was for the advantage of the species that it should not fly. My suggestion already referred to I may quote here: "The season at which these species emerge is the stormiest of the year. The trees are stripped of their leaves, and the shelter afforded by woods and hedges, from severe winds, is less at this period than at any other. Insects flitting about from tree to tree would be more liable to destruction, and it may, therefore, be that partly from the fact that those who could not fly were more likely to escape during the prevalence of a storm, their wings may gradually have become aborted as we find them." Mr. Anderson's suggestion is that those with undeveloped wings would be better able to conceal themselves from birds, and, of course, when the trees and hedges are stripped of their leaves there is really less opportunity for concealment, especially for Lepidoptera whose wings do not fold up. Mr. Pearson then adds a third suggestion, and a very important one, that those females that had not expended their vital force on the development of their wings, would "propagate a greater number of offspring," with the inherited tendency of undeveloped wings. It seems likely then that all these suggestions help us to the solution of the problem so far as it relates to these genera. What cause has operated to produce the same effect in other genera has yet to be sought, and, I hope, the subject so ably introduced by the members of the Haggerston Society will not yet be allowed to drop.

REVIEW.

THE LEPIDOPTERA OF DORSETSHIRE.

By C. W. DALE.

This volume is another valuable contribution to Entomological literature, in the shape of one of those County catalogues, that are alike interesting to

the student and the collector. We are told in the preface that Dorsetshire is but a small county compared with others, having an area of only 632,025 acres, or 988 square miles. It has, however, an exceedingly rich Lepidopterous fauna, and out of 2095 supposed British species, Mr. Dale enumerates no less than 1302 as having occurred within the county, which is only 39 less than Mr. Porritt recorded for Yorkshire, the largest of the English counties, and perhaps one with the greatest variety of surface character. But Dorsetshire has some grand localities. To quote the introduction—

“Containing as it does two much noted localities as Lulworth and the Isle of Portland, and possessing a considerable portion of the extensive heath district, in which a greater part of the New Forest may not improperly be included, it can hardly fail to be rich in variety of insect life.”

But the district is not only really rich in its Lepidopterous treasures, it has been unusually well worked for at least the whole of the present century, and the records have been preserved, giving the author of this Catalogue unexceptional facilities. His father, the late J. C. Dale, whose earliest entomological recollections dated back to the capture of a Queen of Spain (*Argynnis Lathonia*) in the year 1800, and whose last entomological act was an entry in his Diary, on the day of his death, February 6th, 1872, left such a record behind him as perhaps no one ever will again; an entomological journal commenced in the year 1808, and kept continuously to the day of his death just mentioned, an uninterrupted period of 64 years. Nor was he a recorder only. His separate published writings are few in number, but our readers have more than once been indebted to his accuracy and care for valued information on current topics, supplied from this Journal by the author of the volume we are now considering. Every page of this catalogue teems with evidence of his father's work. Important dates from the beginning of the century, and records of species new to Britain or new to science are found in abundance. Nor has Dorsetshire been without other able workers, of whom the Rev. O. P. Cambridge, of Bloxworth, will be best known to our readers. Prior to the publication of the present work, various lists of Lepidoptera occurring on Parley Heath, at the Isle of Purbeck, at the Isle of Portland, at Sherborne, &c. &c., had been published. Of all these Mr. Dale has fully availed himself, and has made his list one of the most full and complete ever published.

Mr. Porritt, in his Yorkshire list gave separate localities for every species except those of universal distribution. Mr. Dale does the same, but classifies his localities by the various riversheds, five in number, and the Isle of Portland and Isle of Purbeck, using the first seven letters of the alphabet to distinguish them. This, in our opinion, is a decided improvement, but we would have been glad to see a small map of the county, with the various

divisions differently coloured. To ourselves, and those who are not acquainted with the district, such a map would be of very great assistance. Compared with the Yorkshire list, the division of the counties into districts is an improvement as already said, but this list does not contain the information on local forms that is so fully given in Mr. Porritt's work.

Only two species appear to be confined (in Britain) to Dorsetshire. These are the Portland Ribbon Wave (*Acidalia degeneraria*), which Mr. Dale tells us has been taken elsewhere at Corfu, and *Hypena obsitalis*, of which a single example was taken at Bloxworth in 1884, by the Rev. O. P. Cambridge. The new British Blue (*Lycæna argiades*), here called the Bloxworth Blue, is at present a Dorsetshire insect only, but there is strong presumptive evidence that it has been taken in Somerset also. A very interesting list of the rarities that have occurred in the various localities is given in the introduction, and a few species are mentioned as having formerly occurred, but being now extinct. Some of these were enumerated by Mr. Dale in the discussion in our pages (see Vol. vi. p. 152) on the extinction of our butterflies.

An interesting appendix is added, containing "a few of the chief rarities, &c., of the other orders of insects." This is a valuable portion of the work, and appears very complete. Of some groups—the Dragon flies for instance—where the species are not numerous, all that have occurred are given. We trust the example set here will be largely followed.

No entomological library will be complete without this work, which is published by Henry Ling, Dorchester, and we trust it will not be long before lists of the Lepidopterous Fauna of other counties will be published.

THE BUCKLER COLLECTION.

By JOHN HENDERSON.

(Continued from Page 119.)

Having dealt at such length with the Diurni, &c., I must conclude the notice of this interesting collection, with a few remarks on the *Geometra*, which Mr. Buckler paid special attention to. *Vespertaria*, *Apiciaria*, and *Advenaria* good; the Thorns, *Dolobraria*, *Lunaria*, *Abniaria*, *Tiliaria*, *Fuscantaria*, *Erosaria*, and *Pennaria* likewise complete. There are four *Hispidaria*, some *Viduaria*, *Glabraria*, and *Lichenaria*, a fine row of bred *Abietaria*, some *Cinctaria*, five *Roboraria*, the *Tephrosias* complete, and Lewes examples of *G. obscurata*. Three *Obfuscata*, a like number of *Trepularia*, which came from G. Clark, of Rannoch, N.B.

Cytisaria were bred from *Genista anglica*, growing on the Portsdown Hills and Westbourne Common; *Papilionaria*, too, have kept their colour well; *Viridata* has a slightly suffused tinge; *Vernaria*, *Lactearia*, and *Bajularia*, all bred specimens. The pretty *Ephyra* group are also complete; these delightful little moths are comparatively easy to rear, *Trilineararia*, a beech feeder, being the most troublesome, the series of all are bred in this collection. In the *Acidalias*, we find *Luteata*, *Sylvata*, and *Blomeraria* very fine; a couple of *E. heperata* follow, and a bred series of *Cambricaria*, the larvæ Mr. Buckler received from the north. *Ochrata* (I think from Mr. Doubleday). *Rubricata* are a good row, some with the purple shade, but not so fine as the second brood Mr. Wellman has recently bred. *Contiguaria* form a special attraction, and are very fine; *Circellata*, three specimens; *Promutata* are followed by two species with written labels (*Marginepunctata* and *mancuniata*), these are placed in the space usually occupied by *Acidalia straminata*. Of the remaining Waves, good specimens of *A. fumata*, *strigilata*, *emutaria*, *inornata* and *degenaria* complete a very extensive list of this most interesting group of the Geometers.

The wonderfully variable forms of *Grossulariata* did not tempt Mr. Buckler to indulge in a series of different markings; *Marginata* are also subject to much variation, the Winter moths, including *Leucophearia* and *Defoliaria* run to strange extremes, and all these are included. Mr. Buckler was always of opinion that a third species of *Oporabia* existed in this country, and he carefully bred *dilutata* and *filigrammaria* with a view to establishing the identity of the third species. There are six specimens of an insect placed next the *Oporabias* in this drawer that I am indebted to the Rev. J. Hellins for an account of. To all appearances this is a very distinct moth, and the label in Mr. Buckler's writing, names them *Autumnaria*. The larvæ he received from Scotland, they differed from both *dilutata* and *filigrammaria*, as does the perfect insect. He was inclined to think the Northern form *approximaria* was a variety of *filigrammaria*, as the same brood of larvæ produced them, both at Lumley and Exeter. *Cesiata* and *ruficinctata* were from friends in the North. *Olivata* and the little Rivulets succeed, and we come to the genus *Eupithecia*, an interesting group of little moths that are general favourites. In one or two cases, Mr. Buckler's idea of nomenclature differs from our present notions and Mr. Doubleday's list. There is one little moth, a unique Pug, which many consider the best insect in this collection; beyond the fact that it was bred from an equally unknown larva, I can find no record of its of its history. *Viretata* and *Lobulata* were bred from larvæ sent by friends, and the principal Carpets—*Rubiginata*, *Albicillata*, and *Procellata*—are from the Challey district, Portsdown, *Unangulata* likewise are bred examples.

Galiata was also reared from the egg, a curious variety of the larva was drawn by the deceased artist. *Ferrugata* and *unidentaria* are, of course, plentiful, I saw many specimens a few days ago in the lanes near Lumley cottage, and on the road to Havant. The remaining Geometræ in the collection do not appear to require much notice. *Undulata*, *psitticata*, and *picata*, are tolerably well-known as constant, but the next few species *corylata*, *immanata*, and *russata* vary exceedingly, and from the same parent Mr. Buckler has a row of good varieties of the two latter species. *Palumbaria* have larvæ of several shades, and *lineolata* was also bred from larvæ figured. Want of space prevents my dealing with the remaining families—*Deltoides*, *Pyrales*, and *Crambites*, which, with the *Tineæ*, form a very large part of Mr. Buckler's collection. It only remains to say in conclusion that the collection is very well preserved, and with a few exceptions, the condition of the insects is perfect. If some public body like the Ray Society become the ultimate possessors of these interesting drawers of Lepidoptera, it will be a boon to the Entomological world, though there is no fear of the name of Buckler being forgotten by English Entomologists, so long as his marvellous work, and untiring energy form the theme of advice to beginners from their elder brethren of the net and pin.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 2, 1886.—R. M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society, *viz.* :—Messrs. C. Baron-Clarke, M.A., F.R.S., H. Wallis Kew, W. Dannatt, J. P. Mutch, B. W. Neave, A. C. F. Morgan, and Wm. Warren.

The President announced that Mr. F. E. Robinson, a Fellow of the Society, and formerly a pupil of Prof. Westwood, had been killed by a tiger in India on April 27th last.

Mr. Stephens exhibited a specimen of *Heydenia auromaculata* (Frey.), from the Shetlands, a species new to Britain.

Dr. Sharp exhibited a number of specimens of *Staphylinidæ*, prepared by him some years ago with a view to their special protection and permanent preservation. The insects were placed in cells of cardboard, and these were covered above, or above and below, with cardboard, the whole being hermetically sealed by applications of successive layers of bleached shellac. The President said the plan appeared to be very successful where the cardboard

cells were left open on both sides, but when the cell was complete below only one surface of the insect could be examined.

Mr. Billups exhibited *Meteorus luridus* (Ruthe), a species of Ichneumonidæ new to Britain, obtained by Mr. Bignell.

Mr. W. White, in exhibiting cocoons of *Cerura vinula*, called attention to the vexed question as to how the perfect insect escapes from these solid structures. He was inclined to think that formic acid, secreted by the insect, was a probable factor in the operation. The question as to the mode of escape from these cocoons of the parastic Ichneumonidæ and Diptera was also raised; and the President, Baron Osten-Sacken, Mr. Waterhouse, and Prof. Meldola made remarks on the subject.

Mr. Elisha exhibited living larvæ of *Geometra smaragdaria* from the Essex marshes. He also exhibited the singular pupæ of *A. Bennettii*.

Mr. Howard Vaughan exhibited a series of several hundred bred specimens of *Peronea hastiana*, showing the innumerable varieties of the species. He also exhibited, on behalf of Mr. Sidney Webb, of Dover, an interesting series of *Cidaria suffumata*, with especial regard to the progeny of particular females, the parent and the produce of the eggs laid by her being carefully separated. Mr. Vaughan also read notes on the subject communicated by Mr. Webb; and Mr. Jenner Weir, Mr. Waterhouse, Mr. Distant, Dr. Sharp, and Mr. Stainton took part in the discussion that ensued.

Mr. A. G. Butler communicated a paper on "New Genera and Species of Lepidoptera-Heterocera from the Australian Region" in which 21 new genera and 103 new species were described.

Mr. J. S. Baly communicated a paper on "Uncharacterized Species of *Diabrotica*."—H. Goss, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

At the Meeting of May 27th, Mr. J. A. Clark exhibited a very beautiful series of *Xylocampa lithoriza* bred from ovæ, and several other exhibits were placed upon the table. Reports from various members were unanimous in stating Epping Forest to be in a very swampy state owing to the heavy rains, and lepidoptera were scarce, especially Diurni; a few half torpid *Alveolus* and *Tages* on the rushes being almost the only species observed.

The next Meeting was the 28th, Annual Meeting, and was chiefly occupied with the Secretary's Report, and with the Election of Officers, all the gentlemen previously serving being re-elected. The President exhibited specimens of *A. prunaria*, bred the same day, and stated that for two years previously he had been breeding the pure orange or lemon forms only, but wishing to obtain some banded forms, he visited Epping Forest in June 1885, and

and secured a banded male, which paired with one of his lemon coloured females, and a large number of *ovæ* were obtained. Strange to say the imagines of this brood were exclusively *banded* forms, he having bred about a hundred specimens without a single pure orange or lemon form amongst them. The general idea is that were a banded male pairs with a pure coloured female or *vice versa*, the result is types of both forms among the offspring, but, the introduction of fresh blood in this case had certainly had a very wonderful effect. Mr. Cripps showed a series of *Bembidium concinnum* from Rainham, and Mr. Lewcock showed *Anchomenus atratus*, *Pterostichus picimanus*, *P. inæqualis*, *Anthicus antherinus*, and various other coleoptera.

Living examples of *Papilio machaon*, *S. fagi* and others were exhibited on the 10th June, by Mr. J. A. Clark, and the President brought up three specimens of *Timandra amataria* bred that day from hibernated larvæ. A specimen of the scarce *Madopa salicalis* was presented to the Society's Cabinet by the former gentleman. Mr. Pearson brought some fine examples of *L. argiolus*, and mentioned having succeeded in obtaining the larvæ of *C. diluta* and *D. oo* at Chingford.

At the following Meeting a very curious suffused form of the common *M. fluctuata* was shown by Mr. Hockett. Mr. Franklin had some abnormally large *A. prunaria*. A living *N. cucullina*, and a series of bred *A. mendica* were in Mr. Clark's box, while a row of the beautiful little *O. wæberana* were shown by Mr. Anderson. Mr. May showed various species of larvæ including *A. pyramidea* from the New Forest, from which locality he had also secured many good species of Noctuæ at sugar, though collecting during the day was not very productive. Mr. Russell had also visited this favourite locality, and amongst other good species enumerated as having been observed must be mentioned *M. fuciformis*, *M. bombyliiformis*, *E. dolabraria* and *N. trepida*. Mr. Russell brought up for distribution amongst the members, some hundreds of the pretty larvæ of *Bombyx neustria*—he having found four broods near Loughton—the species has been very scarce near London for some years past.—ERNEST ANDERSON, Secretary.

NOTES AND OBSERVATIONS.

PRESERVATION OF COLOURS IN DRAGONFLIES.—I have for some years collected dragon-flies, and like our friend Mr. Mackay when I first commenced, I found some of the large specimens not only lost their colour but decomposed, the following year I took the precaution of keeping them a day before killing

them, and directly after death I cleaned out the contents of the stomach and abdomen. To do this I obtained a fine long darning-needle, threaded it with a short piece of thread, tied the ends together and in the loop thus formed I placed some soft darning-cotton, and according to the size of the fly I used one, two, or three pieces, after thus preparing the cotton, I passed the needle into the fly directly under the head, through the stomach and abdomen and pulled the cotton through *until it passed out clean*, I then cut the cotton off *close to the insect* at both ends. If Mr. Mackay will adopt this method he will never have cause to complain, "that they will not keep their colour" this plan of preserving them has another great advantage, for it is a support for the long body, which has a very great tendency, if not so treated, to break off. If the specimens are intended for a museum, where they do not always get that care they ought, I should advise that the last part of the cotton which is intended to remain in the fly, should be damped with *Carbolic acid*, no insects will touch them afterwards.—G. C. BIGNELL, Stonehouse, Plymouth.

THE HONEY BUZZARD AT HARTLEPOOL.—A specimen of this rather rare bird was obtained here a few days ago. It flew into one of the fishing boats a few miles out at sea, and was so fatigued it allowed itself to be captured. Mr. Selby considered the "Honey Buzzard" to be one of the rarest of the Falconidæ, and in his catalogue of the Birds of Northumberland and Durham published in 1831, only records two specimens. Mr. Hancock in his catalogue published in 1874, states that between 1831 and 1868 twenty-five individuals have come under his notice in the two counties. The species has been known to breed in the district, and probably does so frequently. This specimen is now in the possession of Mr. James A. Mann.—JOHN E. ROBSON, Hartlepool.

VARIETY OF THE KESTREL.—A fine variety of this bird has come into my son's possession. The plumage is all light reddish fawn in colour, and the black markings, are much fewer than usual, and what there are, are smaller. It was shot in one of the Denes near here, where the Kestrel is not uncommon. It is a female.—JOHN E. ROBSON, Hartlepool.

TO CORRESPONDENTS.

R.W.—The London Catalogue of British Plants is published by George Bell & Son, Covent Garden, and the price is 6d. per copy. They also supply the Botanical Labels you enquire about, price 5s. The Labels were issued in harmony with the 6th edition.

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SIX MONTHS' WORK AMONG THE TORTRICES AND TINEITES.

By ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

AUGUST.

I ALWAYS obtain a goodly number of Tortrices and Tineites in August. *Teras contaminana* I find in great plenty by the hedges round Cambridge, from now up to October. I notice that it is a very variable moth, but I have failed hitherto in the effort to assign any reasons for its extreme mutability. Some of the specimens I see are quite a bright straw colour, with brownish markings, while others are ochreous grey. Some have the central fascia uniting with the costal spot in such a manner as to form a distinct Y shaped mark, in others the markings take the form of a shapeless black cloud on the inner margin; the general ground colour of the wings being reddish ochreous. In some specimens the markings are reddish-brown, forming a series of reticulations on a reddish ochreous ground.

A tortrix which is fairly common in August is the little *Phoxopteryx lundana*. The forewings have a rich chocolate coloured patch on the inner margin, extending from the base to more than half the length of the wing, the hind margin is pale reddish-brown. There is an angulated bluish line beyond the middle of the wing, and this is preceded by a chocolate coloured streak extending from the costal margin. The costal margin from the base to the middle is white, and the interval between the chocolate coloured patch and the bluish and chocolate-brown streak is also white. The larva feeds on bush vetch (*Vicia sepium*), and meadow vetchling (*Latyrus pratensis*.) Another member of the same genus is abundant on the chalk in the South of England. This is *Phoxopteryx comptana*. It is a moth of about the same size, viz. five lines and a half, as *P. lundana*. Like that species it has a dark

reddish-brown blotch on the inner margin, extending from the base to beyond the middle of the wing, but in *comptana* this blotch shades off gradually towards the costal margin and is not sharply defined at the edge as in *lundana*. This blotch is edged with whitish, and there are two oblique whitish lines beyond the middle, which form an acute angle, and enclose a pale reddish-brown blotch between them. The outer edge of the ocellus is grey, and the central portion brown. In both these species the forewings are more than twice as long as wide, with regularly arched costal margin; the tip is produced, and in *comptana* forms a decided hook.

Bactra lanceolana is a very abundant little moth among rushes, in the Cambridgeshire fens and by the side of the River Cam, and, I believe it is equally plentiful in other places where rushes abound. The palpi in this species are longer than the head, the very variable grey, brownish or ochreous forewings are more than twice as long as broad, with regularly arched costa and oblique hind margin; the tips of the wing are acute. Sometimes the costal half of the wing is much paler than the remainder, but almost unicolorous specimens also occur.

The common *Peronæa ferrugana* may be beaten now out of birch. It is pale reddish ochreous moth with darker reticulations. The pale green larva may also be found in August, living in puckered birch leaves. The moth may be met with from now up to nearly the end of autumn. The white *Catoptria pupillana* occurs in August, among sea wormwood on the south coast. The forewings are more than twice as long as wide, with a very slightly arched costa. The hind margin is but slightly concave below the apex, and rounded at the anal angle. The apical portion of the wing is slightly produced; the basal patch is edged with a brownish grey band; the ocellus is white, enclosing three silvery spots, which are arranged in a line and surrounded with black and ochreous scales.

I fear I shall not have space for the mention of any more tortricine imagos, but several of those mentioned last month still occur. Before I pass on to the tineina I will just mention a few of the tortrix larvæ feeding now. *Leptogramma scabrana* unites elm leaves, in the localities in which it occurs; *Carpocapsa pomonana* is the well-known "maggot" we often find in fallen apples, and *Opadia funebrana* lives in like manner inside plums; *Catoptria albersana* folds down honeysuckle leaves; and the pale green larva of *Peronea hastiana* feeds in August and September between united leaves of shallows. The larvæ of *Coccyx vacciniæ* which have been feeding since June in some localities, on bilberry, are now full grown, and should be collected by those desiring to rear the moths. These are all I have space for, as I have a long list of Tineina to mention.

Many of the Gelechiidæ are out in August. The moths of this family have long, pointed, recurved labial palpi, undeveloped maxillary palpi, and broad—often indented—hindwings. In *Phibalocera quercella*, which is common in most places on oak and other trees in July and August, the antennæ are longer than the forewings. It is rather a pretty little moth, pale rosy grey in colour, and expands three-quarters of an inch. The costal margin of the forewings is decidedly arched and tip acute. There is a pale yellow spot rather beyond the middle of the costa, and a short streak of the same colour starting from its base. The terminal joint of the palpi is slender and pointed, and the second joint has oppressed scales. In *Orthotelia sparganella*, a little ochreous coloured moth with white hindwings, which we find amongst bur reeds in July and August, the antennæ are shorter than the forewings, and the palpi are short, while in *quercella* they are moderately long.

In the genus *Depressaria*, we find the moderately long reflexed palpi with the second joint considerably thickened and brush-like underneath. Many of this genus occur now, as *costosella* and *umbellella* among furze, *arenella* and *carduella* among thistles, *asimilella* and *atomella* among broom, *conterminella* and *ocellella* among willows and osiers, *albipunctella* and *chærophyllivorella* among chervil, *liturella* among knapweed, *applanella* among umbelliferæ, *ciliella* among angelica. Besides these, *purpurella* which feeds in the larvæ state on upright hedge parsley (*Torilis anthriscus*), *pulcherrimella* on common earth-nut (*Bunium flexuosum*), *nervosella* on hemlock water dropwort (*Enanthe crocata*), *nanatella* on carline thistle, and *heraciella* on cow-parsnip (*Heracleum sphondylium*), all occur now.

Alstræmeriella, the larva of which was feeding last month in folded hemlock leaves has white forewings, dusted with pale greyish ochreous; on the middle of the wing is a dark blotch, which extends to the costal margin, and at the extremity of this is a dark red spot. There are also two little black dots before the middle. It expands eight lines. *Purpurella* is about the same size, and is reddish fuscous, dusted with pale yellowish grey along the costal margin and at the base of the wing. About the middle of the wing is a large dark fuscous blotch extending to the costa, and, as in *alstræmeriella*, there are two black dots before the middle; these are followed by some whitish scales. *Conterminella*, *albipunctella*, and *nervosella* are reddish-brown moths. The first-named is dusted with pale yellowish grey, and has a pale greyish ochreous head and middle part of the thorax; *albipunctella* has a white dot in the centre of the wing beyond which is a pale fascia, not acutely angulated as in *nervosella*; the hind-wings of which last-named moth are moreover pale grey. *Carduella* expands seven lines and a half, and is pale reddish ochreous in colour. *Ocellella* is pale greyish ochreous, with a

fuscous coloured blotch, edged with red at the lower part, a little beyond the middle of the wing; at the extremity of this blotch a white dot is visible. *Cherophyllivorella* is a little greyish fuscous-coloured moth, the larvæ of which feeds in July, in the umbels of *Cherophyllum temulentum*. It is just a trifle larger than *albipunctella*, expanding nine lines and a half. *Applanella* is half-a-line larger and has reddish fuscous-coloured fore-wings, clouded with fuscous, and two black dots before the middle, and two white ones beyond. *Ciliella*, which feeds in the larval state on *angelica*, is somewhat like it, but is larger and redder, and has the fringes of the hind-wings tipped with reddish, which is not the case with *applanella*. *Pulcherrimella* is reddish fuscous and *heraciella* greyish ochreous; the remainder are little pale ochreous-coloured moths.

The greyish ochreous furze-haunting *Gelechia mulinella*, the little reddish-ochreous *G. costella*, which feeds in the larval state within the stems, leaves and berries of woody nightshade (*Solanum dulcamara*), the black *G. anthyllidella* which we find in clover fields and the reddish orange *G. hermanella*, the larvæ of which feed in orach and goosefoot will serve as examples of the typical genus of the family. They all have oblong or elongate fore-wings and trapezoid shaped hind ones, emarginate below the tip; the palpi are moderately long and reflexed with terminal joint slender and pointed.

In the *Ecophoridae* we find the moths possessed of long and slender palpi just as in the *Gelechidae*, although not so fully developed, and they have broad blunt heads which the last named family do not possess. Speaking of the palpi, I of course mean the labial palpi, as the maxillary ones are not developed. The fore-wings are mostly elongate, and the hind ones elongate on lanceolate, unindented, with long fringes, *Ecophora pseudo-spretella*, an ochreous coloured moth which feeds in the larval state on dried peas, &c., and the dirty grey *Endrosis fenestrella* which we see in abundance in lumber rooms in houses all the year round, may be taken as examples of this family.

In several localities, chiefly in the North and West of England, occurs in July and August, a little greyish ochreous moth with antennæ ringed with white and brown. This is *Coleophora annulatella* and may be taken as an example of the family *Coleophoridae*. The moths of this family, have the antennæ porrected in repose, the labial palpi are slender, with the terminal joint pointed. The wings are elongate and lanceolate. The moth just named lives as a larva within a short whitish-grey case, to the outside of which it attaches grains of sand; it feeds on the seeds of orach and goosefoot, and should be looked for in the autumn.

Of the family *Elachistidae*, we have in August the dark fuscous *Chauliodus cherophyllella*, whose fore-wings have tooth-like projections of scales on the

inner margin, and which we meet with among the umbelliferæ; the pale ochreous *Laverna epilobiella*, whose larvæ feeds on the tops of *Epilobium hirsutum*; the black-bordered orange-winged *Chrysochista linneella*, on lime trees; *Elachista kilmunella*, which occurs among *carex* in some places; the dark grey *E. nigrella*, the larva of which feeds in the leaves of *Poa trivialis*, the grey *E. Bedellella*, which mines narrow leaved oat-grass (*Avena pratensis*) in July and April; *E. subnigrella*, a dingy grey moth whose larvæ mines the leaves of *Bromus erectus* in April and July; the greyish ochrous *E. megerlella* having a yellow fascia, and in its larva state mining the leaves of *Brachypodium* and *Bromus*; the whitish *E. cerusella*, occurring among reeds; and the greyish *E. biatomella*, which mines the leaves of *Carex glauca* in spring and summer. All these moths have slender filiform labial palpi.

Nearly all the members of the genus *Lithocolletis* occur in August, but as a full account of these little moths was given in a former volume of the *Young Naturalist*, it is unnecessary to say more about them. Besides these, several other species also occur, which I am compelled to omit.

Cambridge.

CONTRIBUTION TOWARDS THE FAUNA OF THE NEIGHBOURHOOD OF PLYMOUTH.

By G. C. BIGNELL, F.E.S.

HYMENOPTERA; ICHNEUMONIDÆ.

Arranged according to the Rev. T. A. Marshall's Catalogue, published by the Entomological Society of London, 1872; the Braconidæ by the Monograph published in 1885.

[Reprinted from the Transactions of the Plymouth Institution and Devon and Cornwall Natural History Society.—1886.]

PART IV.*

ICHNEUMON *impressor*. Bred from *Gortyna ochracea*, 24th June.

primatorius. Bred from *Triphæna fimbria*, 22nd June.

curvinervis. Plymbridge, 26th May.

leucomelas. Bred from *Noctua brunnea*, 22nd June.

bipunctorius. Exeter, 24th August.

AMBLYTELES *armatorius*. Bred from *Triphæna orbona*, 21st July.

crispatorius. Bickleigh, 1st August.

notatorius. Bred from *Triphæna fimbria*, 30th June.

*The previous parts are to be found in the earlier volumes of the *Young Naturalist*.

- PLATYLABUS *tricingulatus*. Bred, 10th June, from *Eupithecia pulchellata*.
 DICCELOTUS *rufilimbatus*. Egloskerry, 23rd July.
 pusillator. Bickleigh, 19th September.
 CENTETERUS *opprimator*. Bickleigh, 21st August.
 PHÆOGENES *calopus*. Bickleigh, 4th August.
 tetricus. A new British species. Exeter, 17th August.
 STILPNUS *pavoniae*. Cann Quarry, 26th September.
 PHYGADEUON *caliginosus*. Stonehouse, 21st August.
 jejunator. Bickleigh, 5th August.
 improbus. Bickleigh, 1st August.
 arridens. Bickleigh, 5th August.
 lacteator. Bickleigh, 19th June.
 sperator. Horrabridge, 3rd June.
 galactinus. Bickleigh, 24th June.
 CRYPTUS *titillator*. Bickleigh, 1st August.
 arrogans. Bickleigh, 1st August.
 hostilis. Plymbridge, 24th September.
 alternator. Bickleigh, 5th August.
 pygoleucus. (-*Agrothereutes hopei*). Bickleigh, 14th September.
 HEMITELES *imbecillus*. Dousland, 23rd August.
 ridibundus. Shaugh Bridge, 22nd May.
 melanarius. Bred from *Argyannis paphia*, 8th July.
 inimicus. Bred from — (??), 14th April.
 tenerrimus. Dousland, 23rd August.
 gracilis (Thoms.) A new British species. Bickleigh, 9th September.
 furcatus (Tasch.) A new British species. Bickleigh, 5th August.
 cuprolus (Thoms.) A new British species. Oreston, 20th September.
 APTESIS *hemiptera*. Bred, 2nd July, from *Euzophera cinerosella*, feeding in the stems of Wormwood, in June, at Slapton.
 HEMIMACHUS *annulicornis*. Plymbridge, Bickleigh, Exeter.
 PEZOMACHUS *tener*. Exminster, 1st July.
 castatus (Bridgman). New species Plymbridge, 7th August.
 juvenilis. Bickleigh, 14th September.
 micrurus. Bred 16th July, the larva feeding on newly-hatched spiders. The parent spider (*Lycosa amentata*) always carries its egg-bag until the young brood is able to care for themselves. The spider with its egg-bag was taken at Horrabridge on the 23rd June.
 ANOMALON *arquatum*. Bred from *Teniocampa gothica*.
 AGRYPON *flaveolatum*. Bred from *Teniocampa miniosa*, 24th March.
 tenuicorne. Bred from *Anisopteryx œscularia*, 25th May.

- CYMODUSA leucocera*. Oreston Quarry, 20th September.
- SAGARITES zonata*. Bred from *Hecatera serena*, 11th September.
- LIMNERIA alticola*. Crabtree, 28th August.
- argentata*. Pennycomequick, 31st July.
- armillata*. Laira, 13th July.
- auctor*. Bickleigh, 4th September
- brevicornis*. Bickleigh, 4th September.
- dispar*. Bred from *Xylopoda fabriciana*, 3rd September.
- ensator*. Bred from *Butalis grandipennis*, 15th May.
- exareolata*. Bred from *Vanessa cardui*, 15th July.
- exigua*. Hooe, 13th August.
- femoralis*. Bred from *Depressaria nervosella*, 10th August.
- geniculata*. Bickleigh, 24th June.
- gracilis*. Bred from *Coriscium cuculipennella*, 14th August.
- hydropota*. Bickleigh, under the viaduct, August and September ;
common.
- erythropoga*. Pennycomequick, 31st July ; Exeter, 17th August.
- pedella* (Holmr.) Longbridge, 25th August.
- volubilis*. Bickleigh, 4th September.
- lateralis*. Cann wood, 21st May ; Bickleigh, 19th June.
- longipes*. Plymbridge, 21st September.
- notata*. Bred from *Gnophos obscurata*, 9th June.
- pagaua* (Holmr.) Bickleigh, 24th June.
- curvicauda*. Bred from saw-fly larva (*Nematus gallicola*), 11th October.
- assimilis*. Plymbridge, 7th August.
- rufipes*. Bred from *Eupithecia castigata*, 21st April.
- sericea*. Bickleigh, 4th August.
- sordida*. Cattedown Quarry, 2nd August.
- tristis*. Bred from *Pseudoterpna cytisaria*, 22nd June.
- tumidula*. Bickleigh, 5th August.
- viennensis*. Bred 21st June from Thrift, in which was feeding *Sericoris littorana*.
- CREMASTUS spectator*. Bolt Head, 17th June.
- infirmus*. Bolt Head, 28th June.
- ATRACTODES gravidus*. Bickleigh, 21st August.
- albovinctus*. Bickleigh, 8th September.
- exilis*. Bickleigh, 9th September.
- gilvipes* (Holmr.). New British species. Bickleigh, 16th September.
- properator*. Bickleigh, 20th August.
- EXOLYTUS laevigatus*. Bickleigh, 20th August ; Plymbridge, 24th September.

- MESOCHORUS *facialis** (Bridg.) New species. Bred from *Apanteles popularis* out of *Euchelia jacobææ*.
dorsalis (Holmr.) New British species. Bickleigh, 21st August.
politus. Bickleigh, 5th August.
vittator. Bred from *Hyponomeuta evonymellus*, 14th July.
- PLECTISCUS *zonatus*. Bickleigh, 4th September.
- PORIZON *harpurus*. Bolt Head, 28th June.
minator. Bickleigh, 9th September; Exeter, 2nd September.
- THERSILOCHUS *marginatus* (Bridg.) New species. Bickleigh, 16th Sept.
jocator. Plymbridge, 21st September.
- BANCHUS *moniliatus*. Bred from *Anarta myrtilli*, 4th June.
- MESOLEPTUS *melanocephalus*. Dousland, 23rd August.
leptocerus (Gr.) New British species. Plymbridge, 21st September.
- CATOGLYPTUS *fortipes*. Horrabridge, 30th June.
- EURYPROCTUS *sinister* (Brischke.) New British species. Longbridge, 25th August.
- PERILISSUS *flicornis*. Bolt Head, 28th June.
subcinctus. Bickleigh, 4th September.
- MEGASTYLUS *mediator*. Exeter, 2nd September.
- IDIOXENUS *borealis* (Holmr.) New British species. Plymbridge, 7th August; Bickleigh, 16th September; Oreston, 20th September.
- MESOLEIUS *aulicus*. Pennycomequick, 31st July.
caligatus. Horrabridge, 16th June.
sanguinicollis. Bred from galls on *Salix caprea*, 10th September.
rufoleptus. New British species. Bickleigh, 3rd August.
lateralis. Bickleigh, 9th September.
- TRYPHON *brachyacanthus*. Bickleigh, 4th August.
- POLYBLASTUS *varitarsus* Bickleigh, 4th September.
westringi (Holmr.) New British species. Plymbridge, 14th July.
- ACROTOMUS *lucidulus*. Bolt Head, 28th June.
- CTENISCUS *triangularis*. Horrabridge, 30th June.
ustulatus. Bickleigh, 4th September.
extirpatorius. Pennycomequick, 31st July.
- EXYSTON *cinctulum*. Bolt Head, 28th June.
- EXOCHUS *mansuetor*. Bred from *Pyrallis farinalis*, 9th July.
curvator. Bickleigh, 19th June.
podagricus. Bred from *Symæthis oxyacanthella*, 18th September.
gravis. Bickleigh, 18th May.
procerus (Holmr.) New British species. Exeter, 17th August.

*This genus are hyper-parasites.

- CHORINAEUS cristator*. Horrbridge, 3rd June.
- ORTHOCENTRUS anomalus*. Crabtree, 28th August.
- affinis*. Bickleigh, 19th September.
- agilis*. (Holmr.) New British species. Ivybridge, 20th August.
- marginatus* (Holmr.) New British species. Bolt Head, 6th July.
- cognatus* (Holmr.) New British species. Plymbridge, 7th August.
- BASSUS cingulatus*. New British species. Plymbridge, 7th August.
- albosignatus*. Horrbridge, 3rd June.
- insignis*. Plymbridge, 20th May.
- abdominator* (Bridgman.) New species. Dousland, 23rd August.
- strigator*. Laira, 23rd September.
- signatus*. Longbridge, 25th August.
- gracilentus*. Bickleigh, 14th September.
- elegans*. Plymbridge, 7th August.
- Sundevalli*. Laira, 10th September.
- POLYSPINCTA varipes*. Bickleigh, 14th September; Exeter, 23rd September.
- ACRODACTYLA madida*. Bickleigh, 5th August.
- degener*. Dousland, 23rd August. The larva is an external parasite on full-grown spiders.
- GLYPTA monoceros*. Bred from *Tortrix costana*, 29th June.
- fronticornis*. Bickleigh, 9th September.
- LAMPRONOTA nigra*. Dousland, 23rd August.
- caligata*. Bickleigh, 4th August.
- LISSONOTA terebrator* (Bridgman.) New species. Bred from *Anticlea badiata*.
- vicina*. New British species. Bickleigh, 16th September.
- decimator*. Bred from *Gortyna flavago*, 4th May.
- insignita*. Plymbridge, 24th September.

BRACONIDÆ.

- BRACON nigratus* (Wesm.)
- erraticus*. Bickleigh, 21st August.
- lavigatus*. Bred from Sawfly galls on *Salix caprea* (*Nematus viminalis*), 22nd August.
- tornator*. Bickleigh, 9th July.
- Satanas*. Plymbridge, 30th June.
- epitriptus*. Bred from a gall of *Hormomyia caprea*, 3rd September.
- larvicida*. Bickleigh, 21st September.
- prætermisus*. Bickleigh, 9th September; Exeter, 10th September.
- discoideus*. Bickleigh, 9th July; Plymbridge, 14th July.
- regularis*. Yelverton, 4th August.
- variator*. Yelverton, 4th August.

osculator. Yelverton, 4th August; Bickleigh, 4th September.

obscurator. Bred from *Homæosoma sinuella*, 28th May.

anthracinus. Bovisand, 25th June; Bickleigh, 9th July.

PHANOMERIS *fragilis*.

COLASTES *decorator*. Plymbridge, 30th June; Bickleigh, 9th July.

hariolator. Bickleigh, 14th September.

braconius. Bred from old oak leaves, 28th April; Bickleigh, 9th July; Ivybridge, 20th August.

ONCOPHANES *lanceolator*. Bred from *Tortrix viridana*, 14th June.

RHOGAS *dimidiatus*. Bred from *Agrotis tritici*, 4th July.

gasterator. Yelverton, 4th August.

geniculator. Bred from young larva of *Odonestis potatoria*.

tristis. Bred from *Satyryx* (= *Epinephele*) *tithonus*, 17th July.

circumscripтус. Very common, and on many larvæ. *Ebulea crocealis*, 20th June; *Teniocampa stabilis*, 20th June; *Melanippe galiata*, 21st September; *Agrotis agathina*, 9th April; *Noctua neglecta*, 1st April.

SIGALPHUS *caudatus*. Whitsand Bay, 13th September; Exeter, 14th Sept.

obscurellus. Bred from *Gymnetron noctis* larva (a beetle), feeding on the unripe seed of the toad flax, 9th September.

CHELONUS *inanitus*. Common; Plymbridge, Bickleigh, Oreston Quarry, &c.

carbonator. Oreston Quarry, 1st August.

parcicornis. Bickleigh, 9th July.

ASCOGASTER *canifrons*. Bickleigh, 9th July.

annularis. Bred from old furze-sticks containing larvæ of *Ecophora lambdella*.

rufipes. Bred from a *Tortrix* off birch, 17th July.

rufidens. Bred from *Gracilaria syringella*, 26th July.

quadridentatus. Bred from *Eupithecia absinthiata*, 8th July.

APANTELES *solitarius*. Bred from *Orygia antiqua*, *Teniocampa miniosa*, 4th July; and *Hybernia defoliaria*.

ruficrus. Bred from *Leucania littoralis*, 27th May; *Spilosoma menth-astris*, 7th September.

congestus. Bred from *Hadena pisi*, 12th October.

Bignellii. Bred from *Melitæa artemis (aurinia)*, 26th July.

limbatus. Bred from *Abraxas grossulariata*, 14th July.

rubripes. Bred from *Geometra papilionaria*, 17th July.

rubecula. Bred from half-grown larvæ of *Pieris rapæ*, 17th June; one only in a larva.

- glomeratus*. Bred from *Pieris brassicæ*. I have found 142 cocoons from one larva; the usual numbers vary from forty to eighty. It also infests *P. rapæ* and *Abraaxas grossulariata*.
- sericeus*. A solitary parasite. Bred from *Tethea retusa*, 28th June; *Dianthæcia cucubati*, 15th May; *Eupithecia pulchellata*, 13th July.
- spurius*. A gregarious parasite. Bred from *Vanessa urticæ*, 1st September; *Melitæa artemis (aurinia)*, 15th May; *Leucania littoralis*, 31st May; and *Agrotis præcox*, 26th June.
- zygænarum*. Bred from *Zygæna filipendulæ*, 21st July.
- caia*. Bred from *Arctia caia*, 21st April and 30th June.
- juniperatæ*. Bred from *Odontoptera bidentata*, 2nd April; *Selenia illunaria (bilunaria)*, 12th July; *Crocallis elinguaris*, 3rd April; *Himera pennaria*, 19th June.
- nothus*. Bred from *Anticlea badiata*, 26th June; *Epinephele Janira*, 1st August; *Melanippe galiata*, *Tethea retusa*, *Spilosoma menthustri*, 1st August.
- difficilis*. Bred from *Zygæna filipendulæ*, 26th July; *Euchelia jacobææ*, *Bombyx rubi*, 17th August; *Agrotis præcox*, *Hadena pisi*.
- punctiger*. Bickleigh, 24th June.
- falcatus*. Bred from *Xylophasia polyodon (monoglyphæ)*, 24th July.
- dilectus*. Bred from *Gracilaria syringella*, 16th July.
- xanthostigmus*. A solitary parasite. Bred from *Diurnea fagella*, 11th September.
- prætor*. Oreston Quarry, 1st August.
- emarginatus*. Bred from *Depressaria nervosa*, 2nd August.
- obscurus*. A solitary parasite. Bred from *Ebulea crocealis*, 12th and 30th July.
- viminetorum*. Bred from *Elachista magnificella*, 30th June.
- albipennis*. A solitary parasite. Bred from *Lioptilus microdactylus*, 22nd June; found in March in the dead stems of *Eupatorium cannabinum*.
- impurus*. Bred from *Tortrix Forsterana*, 2nd August.
- gagates*. Bickleigh, 21st and 29th August.
- fuliginosus*. Bred from *Gracilaria syringella*, 16th July.
- sicarius*. Bred from *Sericoris littorana*, 19th June.
- octonarius*. Bred from *Notodonta ziczac*, 23rd July.
- abjectus*. Bred from *Lophopteryx camelina*, 27th May.
- immunis*. Bred from *Pseudoterpna cytisaria (pruinata)*, 20th July; *Hybernia progemma (marginaria)*, 12th June; and *H. leucophaæaria*, 23rd June.
- caberæ*. A solitary parasite. Bred from *Cabera pusaria*, 5th April; *Iodis lactearia*, 4th May; *Selenia illunaria (bilunaria)*, 14th April.

- popularis*. Bred from *Euchelia jacobææ*, 20th July.
fraternus. Bred from *Aspilates citraria* (*ochrearia*), 20th September.
pallidipes. Bred from *Plusia gamma*, 16th October.
bicolor. Bred from *Gnophos obscuraria*, 5th June.
formosus. Bred from *Uropteryx sambucaria*, 4th May.
callidus. Bred from *Nemeophila plantaginis*, 8th June; *Abraxas grossulariata*, 7th June; and *Triphaena orbona*.
lateralis. Bred from *Symethis oxyacanthella*, 15th September.
vitripennis. Bred from *Boarmia repandata* larva not half-grown, 14th April.
fulvipes. Very common on numerous larvæ found in the spring.
- MICROPLITIS *ocellata*. Bred from *Smerinthus populi*, 8th May.
vidua. Bred from *Teniocampa instabilis* (*incerta*), 30 July.
tristis. Bred from *Dianthæcia cucubali*, 22nd May.
mediator. Bred from *Cerastis spadicea*, 30th June.
mediana. Bred from *Teniocampa stabilis*, 4th September.
tuberculifera. Bred from half-grown larvæ of *Teniocampa miniosa*, 19th June.
- MICROGASTER *alvearius*. Bred from *Boarmia rhomboidaria* (*gemmaria*), I bred the extraordinary number of 133, on the 21st August last, from one caterpillar, found on jessamine at Laira.
posticus. Bred from *Porthesia auriflua* (*similis*), 25th July.
flavipes. Bred from *Boarmia repandata*, 26th June.
minutus. Bred from *Cleora glabraria*.
marginatus. Bred from *Larentia pectinitaria* (*viridaria*), 28th May.
calceatus. Bred from *Thera variata*, 24th June.
connexus. Bred from *Porthesia auriflua* (*similis*), 18th August.
subcompletus. Bred from *Vanessa Atalanta*, 11th August; *Hypena proboscidalis*, 7th June
tibialis. Bred from *Emmelesia decolorata*, 4th September.
spretus. Bred from *Rhodophæa consociella*, 14th July.
- STONEHOUSE, 30th March, 1886.

ON THE ARRAN HILLS.

BY JOHN MACKAY.

I daresay it would be needless for me to explain the reasons why I delight so much in collecting in Arran. No doubt, the fact that so many rare and curious forms of lepidoptera are to be found there has something to do with

this liking, but in addition to this, the picturesque beauty of the Island, adds a peculiar charm to its entomological attractions. The entomologist is usually well satisfied when he visits a spot where he can fill his boxes with species of which he requires series, but when the spot is situated on the gentle slope of a heather-clad hillside, from which a magnificent view of the Firth of Clyde and the beautiful coast round about may be had, then I think such a place affords more real delight to the naturalist, than one in which only a "series may be had." Those of my readers who pass over this short paper away down in the "Sunny South" can have little idea of the beauty and many charms of our favourite collecting ground, in the wild and mountainous land of the Celt. I can fancy some of my readers may think that we Scotchmen are always too enthusiastic about everything. Well, in this particular instance, no entomologist who has ever visited Arran, will find much fault with my enthusiasm. Indeed, to enjoy one ramble over the Arran hills, in search of insects, is enough in itself to induce again on a day's outing the most thorough "stay at home" entomologist.

Having thus explained some of the inducements which Arran offers to the entomologist, it is not surprising that the entomological members of the Clydesdale Naturalists Society, when the excursions for the season were being arranged, should take good care that a visit to Arran be entered on the card for July.

July, that delightful month of bright sunshine and cloudless skies, came in due time, and on the morning of Saturday, 3rd inst, several of the entomological members of the Society, left St. Enoch Station by the 8.40 a.m. train for Arran, via Ardrossan. At the latter place we went on board the "Bro-dick Castle," which quickly conveyed to our destination. Landing at Brodick we at once proceeded to the scene of our operations, taking the road leading round the edge of the hills, near the coast, to Lamlash. The day was lovely, and had it not been for a rather stiff breeze, which made collecting on the hills very difficult, we should have had a much more successful day's collecting. The hills sloped down to the shore, and the wind blowing towards the coast, caught up anything that rose from the heather, and in an instant carried far beyond reach. We had, therefore, to be very watchful, and strike instantly on a flutter of a wing being seen.

Entering from the road into a grassy meadow, we here found a few Common Blues flitting about in company with numbers of the Small Heath. Ascending the hill, towards the heather, *Eubolia palumbaria* was taken in fine condition, along with a number of smaller things. *Fidonia atomaria* was still on the wing, a few stray specimens being seen at times. The first capture of any importance was a freshly emerged specimen of *Chelonia*

plantaginis, which Mr. McGrouther netted. A search was then made for more of this species, with the result that a few more nice specimens were taken by each. Work on the face of the hill soon became tiresome, owing to the strong wind, so a move was made further up into a sheltered hollow, and here some more *Plantaginis* turned up. *Bombyx quercus* was our next capture, three specimens being taken, while others were seen at times flying before the wind at a surprising speed. *Anarta myrtilli* caused us some amusement. With every blink of hot sunshine, specimens of this little moth would be seen darting over the heather like so many electric flashes, causing us many a long chase; and, after exhausting our running powers, they would quietly drop down out of sight, where we knew quite well we could never find them. However, notwithstanding these mean tricks, we each managed to take a good few specimens in fine condition. A pretty little loch, situated in a quiet sheltered hollow caught our sight, and we at once hastened toward it, in the hope of taking some dragon-flies. A number of beautifully tinted specimens were taken, but owing to the strong wind, which was felt even in this sheltered corner, few were on the wing. A visit to this spot on a hot still day should prove most remunerative to anyone in search of dragon-flies. *Plantaginis* again appeared here, along with a few of *Eupithecia satyrata*, and some specimens of another geometer which I have not yet been able to identify. *Scodiona belgiaria* was our next capture, while near some trees both *Melanthia ocellata* and *Larentia pectinitaria* were netted. *Crambus pratellus* was very common on the heather, and some specimens of that pretty speckled tortrice, *Mixodia schulziana*, were also boxed. Having by this time reached a little glen, where two years we had taken *Argynnis selene*, a careful search was made for it, and we soon aroused a few specimens among the heather. Some distance further on it was again met with in greater numbers, and each of us captured a good number of fine specimens. A rather good Crambite (*Phycis carbonariella*) was taken rather sparingly, and was not nearly so common as on the shore at Lam-lash, where at this season it can be taken in great profusion.

By this time we had once more reached the road leading over the hills from Brodick, and as our time was now very limited, we packed up our nets, and hastened to catch the steamer at Brodick. We left at 6 p.m., having spent about seven hours ashore collecting. Although we had spent a most enjoyable day, and had filled nearly all our boxes, yet we were disappointed at not having taken one or two species which we had expected to meet. *Plusia interrogationis* is usually met with on the heather, near Lam-lash, at this time, while the beautiful and scarce Arran variety of *Cidaria rus-sata*, which occurs sparingly at the same place, should have been on the

wing. The lateness of the season, no doubt, may account for their absence. Insects were, undoubtedly, much scarcer than they were at the same place and time during the past two seasons, but the collector who visits Arran about the middle of the month will likely meet with those species, and many others which were absent during our visit. But, although we did not take all the species which we should have liked, we came home greatly benefited by our day's collecting on the Arran Hills—and, after all, what are insects to be compared to the blessings of good health and a sound constitution.

78, Gloucester Street, Kingston, Glasgow.

NOTES ON LEPIDOPTERA.

By B. LOCKYER.

LEUCOPHASIA SINAPIS.—Woods (plantations only) between Brockenhurst and Lyndhurst, and near Minstead, New Forest. May, July, and beginning of August. Took 70 in May, 1885, and had specimens (one or two of each) of the two varieties, one lovely supposed *Diniensis*, rather smaller than the average run of specimens, and of a very milky white. The *Erysimi*, on the contrary, was of a duller and more washed out tint, but I did not notice whether there were sexual differences. I only met with one or two of the of the autumnal brood (in August, 1871). I do *not* know the larva. It is as local an insect as any I know, being almost confined to *certain paths* in *the centre* of the two young plantations, Park Hill and Stubby copse; the former I hear has been given up to the deer.

ANTHOCARIS CARDAMINES.—Took one near Park Hill inclosure, May, 1875.

GONEPTERYX RHAMNI.—April, May, July, August. Highgate, Hampstead (Middlesex) *used* to be common. Abundant (especially about outskirts of younger inclosures) New Forest. Larva on upper side of leaves of *Rhamnus catharticus*, June. Only in and near woods.

COLIAS EDUSA.—July, August. Ilfracombe, Lynton (North Devon), 1865. Leigh, near Southend, Essex, 1868; also at Hastings (Fairlight), August 1877; near Hadleigh, Essex (1 only) 1878.

ARGYNNIS PAPHIA.—July and August. Woods and their vicinity, near Ilfracombe, North Devon, and in the New Forest. Common.

VAR. VALEZINA.—One in Park Ground inclosure, Clay Hill, New Forest, July, 1875, fluttering at bramble bloom; and near Whitby, Yorkshire.

A. AGLAIA.—New Forest (young inclosures and rough ground only.) Never found it common. Settles on thistle heads, &c. in the sunlight. July and August. Also Ilfracombe, &c.

A. ADIPPE.—Same remarks apply. Once took a variety in Stubby Copse, allied to *Cleodoxa*, but not in fine condition. Whitby, Yorkshire.

A. EUPHROSYNE.—Park Hill and Stubby Copse, New Forest and West Wickham Wood, Surrey. Common May, July, and August. Has anybody ever proved this double brooded in the strict sense of the term? It is the only *Argynnis* I ever saw in copula. I took two pairs in one day in May, 1875, and obtained ova as recommended by the late W. Buckler, by confining them under glass shade with living roots. They lived some time and deposited a few ova per diem. They (the larvæ) are retired in their habits and easy to rear as long as the food is kept fresh.

VANESSA C-ALBUM.—Two or three larvæ on wych elm, near Tintern Abbey, Monmouth.

V. POLYCHLOROS.—Common, but local, as a larva; rare as a perfect insect. Various parts of the "virgin" forest, New Forest.

V. CARDUI.—July and August. Once bred from larva taken in a field near Camden Town, London, 1868, also at Ilfracombe, &c. (common); Southend (Essex) and Yarmouth (1879).

LIMENITES SIBYLLA.—July and August; fine condition about the middle to end of July. New Forest. Shave green enclosure, Minstead (a young plantation), and the woods between Brockenhurst and Lyndhurst, on the side of the road nearest Southampton Water, especially the two inclosures near Clay Hill Hamlet, called Park Ground and Pond Head. Frequents bloom of *Rubus fruticosus*, and also comes freely to sugar, especially on fir trees even if put on the previous evening. A very pretty subject for breeding from the larvæ, which may be beaten by day from its food-plant, though I have always found it scarce; two in a couple of hours being my largest bag. I never saw it at night, though I searched for it in its head-quarters several times. I never found an ichneumonid larva. There is a variety of the perfect insect entirely or nearly black, but I never took one.

LYCÆNA ÆGON.—July and August. Heaths near Lyndhurst, &c., New Forest. Took a lovely variety of the female in 1873, shot with the blue of the male, though rather more intense in hue, at the base. Very common.

L. ARGIOLUS.—Not common. May. New Forest.

NEMEOBIUS LUCINA.—Rare and local, chiefly Park Hill. May. New Forest.

SYRICHTHUS ALVEOLUS.—Common. Near Addington, Surrey, and in the New Forest. Rough ground, open ridings of young plantations, &c. May.

THANAOS TAGES.—Not so common, same localities as preceding. May.

HESPERIA SYLVANUS and LINEA.—Woodland paths, July and August. New Forest.

S. POPULI.—At light. May and June. Larvæ once common about North London; also at Ilfracombe (Lynton) and Whitby (Yorkshire.)

S. TILLÆ.—May. At rest on lime trees by day and at light. Larvæ not common on the trees in August. Camden Town (North London.)

ACHERONTIA ATROPOS.—One larva at Lyndhurst, 1871. Brown variety, perfect insect emerged by forcing in September.

SPHINX LIGUSTRI.—Used to occur in May and June in the gardens about Camden Town, hovering over petunias, &c., and the larva occurred on lilac and privet in the autumn. Never common.

CHÆROCAMPA ELPENOR.—Saw one, said to have been taken at sugar in Denny Wood, New Forest.

MACROGLOSSA STELLATARUM.—This would seem to be of erratic appearance. Larvæ occurred commonly on the main road to Minehead, Somerset, August, 1865, on *galium*. The imago was in good condition but scarce, near Hadleigh Castle, Essex, August, 1869, fluttering along hedgerows by day. Visited the same locality in the hot June of 1878, but could not see a specimen. Larva at Yarmouth as already recorded—it ought to abound there as *galium* is extraordinarily abundant.

(To be continued.)

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

July 7, 1886.—J. JENNER WEIR, F.L.S., Vice-President, in the chair.

Mr. S. H. Scudder, of Cambridge, Mass., United States, was elected a Foreign Member of the Society.

The Rev. H. S. Gorham exhibited specimens of *Eucnemis capucina* (Ahr.), a species new to Britain, discovered in June last in an old beech tree in the New Forest. He also exhibited specimens of *Cassida chloris*.

Dr. Sharp exhibited larvæ of *Meloë*, and read notes on their habits; and Mr. Saunders exhibited a specimen of *Halictus* infested with about thirty *Meloë* larvæ.

Mr. Billups remarked that he had recently found forty-seven larvæ of *Meloë* on the body of a species of *Eucera*.

Dr. Sharp said that he was of opinion that the operations of these larvæ were not the result of instinct, but were more like reflex actions; the instant the larvæ touched a suitable surface they clung to it. The discussion was continued by Prof. Riley, who disagreed with Dr. Sharp, and believed these larvæ were guarded by instinct, as they showed a decided preference for particular hosts.

Mr. Jenner Weir exhibited a male of *Lycæna adonis* (*bellargus*) and a female of *L. icarus*, which had been captured in *copula* by Mr. Hillman, and shown to the exhibitor at the time of capture. Mr. Weir also exhibited some specimens of *Lycæna* which he believed to be hybrids between *Lycæna adonis* (*bellargus*) and *L. icarus*; and he further exhibited, on behalf of Mr. Jenner, four specimens (all males) of *Phosphænus hemipterus*, taken at Lewes.

The Rev. W. W. Fowler exhibited two specimens of *Chrysomela cerealis*, lately taken by Dr. Ellis on Snowdon; and also two specimens of *Actocharis Readingii*, found at Falmouth by Mr. J. J. Walker.

Mr. E. B. Poulton called attention to the fact that the larvæ of some Lepidoptera, if fed in captivity on an unusual food-plant, subsequently refused to eat their ordinary food-plant. He stated that he had observed this with the larvæ of *Pygæra bucephala* and *Smerinthus ocellatus*. Mr. Stainton, Mr. Fowler, and others made some remarks on the subject.

Mr. Elisha exhibited a series of bred specimens of *Geometra smaragdaria*, together with the cocoons, containing the empty pupa-cases, attached to the stems of the food-plant.

Mons. Alfred Wailly, who was present as a visitor, exhibited a long series of silk-producing moths, including some remarkable hybrids between *P. cecrosie* and *P. ceanothi*; and Professor Riley and Mr. Weir made some observations on these hybrids.

Dr. Sharp read a paper on "*Eucnemis capucina* (Ahr.) and its larvæ."

Mr. Dunning read a report on the subject of the importation of humble-bees into New Zealand, from which it appeared that the efforts of Mr. Nottidge, of Ashford, and the Canterbury (N.Z.) Acclimatisation Society, had been successful, and that the long-wanted clover-fertiliser had at length been established in New Zealand.

Mons. Peringuey communicated "Notes on some Coleopterous Insects of the family *Paussidæ*."

Mr. J. B. Bridgman communicated "Additions to the Rev. T. A. Marshall's Catalogue of British Ichneumonidæ."

Prof. Riley read "Notes on the phytophagic habit, and on alternation of generation, in the genus *Isosoma*." In this paper Prof. Riley described, from direct observation, the phytophagic habit in two species of the genus.—
HERBERT GOSS, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

There was a large muster of members at the meeting held 24th June, Mr. Cripps, the Vice President, presiding. A discussion on the life history of

Satyrus megæra took place, the subject being introduced by Mr. E. Cooper. Among various interesting items relating to its habits, several members drew attention to the very early hour at which it commences flying, indeed, it was stated that this species is the earliest flying of all our British Diurni. The exhibits on the table included *Geotrupes sylvatica*, and a peculiar variety of *Coccinella bi-punctata* by Mr. Cripps. Five *A. alni* and some *A. sinuata* by Mr. A. J. Clark. Some beautiful *A. herbida* captured at Brockenhurst on sugar by Mr. Pearson. Varieties of *A. lubricipeda* by Mr. Harper, and *M. fuciformis* by Mr. May.

At the following meeting the President (Mr. Hockett) brought for inspection, some fine *C. elpenor* and a very handsome species of ichneumon, bred from same. The Curator read a letter he had received from a former member now at Bangalore, describing that locality which is known as "the flower garden of India" and stating that life was in the greatest profusion there. Two specimens of (*D.*)? *Hamata* were enclosed in the letter, and arrived in very good condition.

On July 15th, Mr. J. A. Clark brought forward the life history of *S. semele* for discussion and a very instructive evening ensued.

The two following meetings were chiefly remarkable for the large exhibits of *A. prunaria* by various gentlemen, some very beautiful forms and great variation being shewn. The very large deeply splashed forms shewn by the President were greatly admired, and some curious dark banded specimens were shewn by the Secretary.—ERNEST ANDERSON, Secretary.

NOTES AND OBSERVATIONS.

HEPALIUS VELLEDA, VAR. CARNUS AT GLASGOW.—I remember sometime ago reading some interesting notes, which appeared in the "Young Naturalist," regarding this species. Perhaps a few notes on its occurrence this season, may prove interesting. *H. vellea* has been this season more common at Possil Marsh than it has been for many years past. Being desirous of taking some nice specimens of the var. *Carnus*, I paid a visit to the Marsh on the evening of Monday, 5th July, and captured a number of specimens. On examining my captures at home, I found that I had only succeeded in taking one of the variety. I again visited this locality on three different occasions and netted a large number of this Swift, but, altogether, I found that only about one-fifth were of the variety. One evening I paid a visit to Cadder Wilderness, where *velleda* rather sparingly, and took about a dozen specimens

of it, of these only one was *Carnus*. I next resolved to try a locality at Pollokshields, where I had taken *velleda* on the two former seasons, but found it rather rare. I captured some specimens, but they were all of the usual form. This remarkable scarcity of the var. *Carnus* seems to me quite unaccountable. Three years ago it was almost as common as the ordinary type. In one night you could take almost as many of the one as you could of the other. In '84, *velleda* was very plentiful at Possil, and both forms were in about equal numbers. Last year, however, both the type and the var. were very scarce and only a few specimens of the latter were taken. Now that the species is so common this season, it seems strange that *carnus* is so scarce compared to the number of the other. Several of my friends who have taken *velleda* at the Marsh, tell me that their experience was in accordance with my own. Another entomologist who collected with me the other evening told me yesterday, that he did not find a single specimen of the variety among his captures. It would be entertaining to know if the scarcity exists in other districts where *velleda* occurs. Perhaps those readers who take this species will record their experience this season.—JOHN MACKAY, Kingston, Glasgow.

PRESERVING THE COLOURS IN DRAGONFLIES.—I have to thank Mr. Bignell for his suggestion as to the preservation of the brilliant colours in dragon-flies. It is rather curious that on returning from a collecting excursion in Arran, where I had taken some very beautiful scarlet, and yellow and black dragon-flies, I found that the July "Young Naturalist" had arrived during my absence. Glancing over the contents, my eye caught Mr. Bignell's interesting note, and on reading his suggestion, I determined at once to give it a fair trial. I must admit that the result of my experiment was highly satisfactory. Instead, however, of using darning cotton, as Mr. Bignell advises, I first passed through the body of the insect a small piece of rough worsted, which thoroughly cleaned out the contents of the abdomen, after which I folded several threads of fine stiff coloured silk threads together, in proportion to the size of the insect being operated upon, and these I passed into the body, cutting off the remaining bits close to the body at both ends, of course, I used thread the same colour as the body of the insect, the shell of the long abdomen being so transparent that the colour of the thread within helps to give the insect its original appearance. I find that the specimens thus treated have retained their colour remarkably well, and altogether Mr. Bignell's method of preserving dragonflies is the best I have tried yet, I am only sorry I did not know about it sooner, as the large number of pretty specimens which I took last year in Knapdale, Argyllshire, are now quite useless, having completely lost their beautiful brilliant colours.—JOHN MACKAY, Kingston, Glasgow.

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RECORD OF A WEEK'S COLLECTING IN NORTH KNAPDALE, ARGYLLSHIRE,

IN JULY, 1886.

By JOHN MACKAY.

I CANNOT conceive anything more calculated to make the entomologist truly miserable than to experience a period of bad weather when away on his holidays. In this remote little village (Tayvallich, Argyllshire), and seated at the window, I look out and watch the rain drifting in dense sheets towards the loch far below. The hills all around are shrouded in a canopy of mist and rain. The herbage is dripping wet, and not a person is to be seen as far as the eye can see along the village road. The rain patters, patters, unceasingly on the window, quite decided that it will continue doing so for some hours to come. The evening is fast advancing, and the shadows are deepening, and with a conviction, not unmingled with despair, we have finally given up all hopes of doing any collecting to-night. In a room downstairs, my friends, Mr. James McGrouther, and Mr. A. M. Stewart, of Paisley, are enjoying the bliss derived from the balmy weed, and, no doubt, to forget the disappointment experienced to-day, are discussing the probability of our having a bright and sunny day to-morrow. Blessed hope, not likely to be realised! Not being a smoker myself I have come upstairs, and not forgetful of a promise made recently to our worthy friend Mr. Robson, I now purpose sending for the benefit of my entomologist friends in the Sunny South, a short account of our collecting experiences during the last few days in this quiet and secluded corner of the Land of the Mountain and the Flood. It is pleasant, now that the weather is so unfavourable, to think that we did not forget to take every advantage of the few days of good weather we have already had. It is, therefore, regarding our work on those days that I intend making some remarks.

On Friday morning, 16th July, my friend Mr. McGrouther and myself left Glasgow by the splendid steamer "Columbia," and reached Ardrishaig about 1 p.m. Here we found that the carrier's gig was already fully engaged, so taking the canal boat we sailed along the Crinan to Cairnbann Hotel, and from thence walked over the hills, a distance of some nine miles, to Tayvallick, reaching our destination quite as soon as the mail gig. Having previously engaged lodgings at the house of our good friend the schoolmaster, we were here entertained to a most refreshing tea, after which we put a few chip-boxes in our pockets, and went out to see what insects were on the wing. Our captures consisted chiefly of species of little note, such as *Hectus*, *Margaritata*, *Immanata*, *Propugnata*, *Rhomboidaria*, etc., and as the night was rather cold, we did not search for insects very particularly.

Next morning we were up betimes, for nothing is more delightful and refreshing in the Highlands, than to take a walk on a bright and still morning before the people are moving about, and when everything is so peaceful and beautiful all around. There is a peculiar grandeur in Highland scenery which can only be thoroughly appreciated in the early hours of the morning, there is then nothing to detract the attention, and the great and "Everlasting Hills" may be seen reposing in all their impressive dignity, their rugged crests crowned with a circlet of dewy mist. Breakfast over and vasculæ packed with collecting apparatus, we walked along the road leading to Tainish, and soon reached the moor, where last year, I had taken a large number of *C. davus*. To our extreme disappointment we found that the heath had been since burned, and our most careful search, resulted in only a few specimens being taken. *L. alexis* and *S. janira* were flitting about sparingly, and were not anywhere in the same profusion as I saw them last year. Our first capture of any importance was *Acidalia fumata*, which occasionally turned up on the moor. In the ditch alongside the road *H. stagnalis* was rather common, but *Nymphæalis* was very scarce. Some nice specimens of *Crambus pascuellus* were also taken on the moor, and in marshy fields. Leaving the heath, we passed the keeper's house, and entered a tract of fine wooded country. Here some beautiful specimens of *A. aglaia* were seen, but we could not get near enough to net any. While collecting here, two types of *Plusia V-aureum* started up from the grass, and these were speedily netted. As it was now near one o'clock, we decided to return home for dinner, and while doing so my friend took a rubbed specimen of *A. selene*, at the very spot where last year I took a similar bad one.

At five o'clock, the carrier's gig was seen approaching the village, and hastening to meet it we met our friend Mr. A. Stewart, laden with bag, sketching materials, etc. Relieving him of some of his parcels, we returned

to the schoolhouse, where we soon learned that he was as much delighted with the picturesque little village as we were ourselves. The evening being a favourable one for work, we started for the road leading alongside Barmore Hill, where we intended having a good night's collecting. Insects were flitting about in any number, and before long we had filled all our boxes. Fine specimens of *H. hectus* were hovering in great profusion over almost every fern, some of them being strange varieties. Moths were so plentiful that we had to net on mere chance, and it was only when we commenced to pin our captures in the morning that we discovered what species we had taken. A careful record of our daily individual captures was kept, and I find on consulting it that the following species were taken on that evening.—*N. mundana*, *P. lacertula*, *M. margaritata* (very common), *C. populata*, *immanata* (the white banded form), *M. ocellata*, *B. rhomboidaria* (common, but mostly rubbed), *L. marginata*, *E. albulata*, *A. aversata*, *L. didymata*, *pectinitaria*, *C. munitata*, *propugnata*, *T. batis*, *L. impura*, *X. rurea*, *N. xanthographa*, *rubi*, *P. V-aureum*, *H. grisealis*, *H. stagnalis*, *nymphæalis*, *B. fuscalis*, *C. pratellus*, *pascuellus*, *B. lanceolaua*, *G. campoliliana*, *E. augustana*, *C. hohewarthiana*, *M. schulziana*, and a number of species unknown to us. Although our captures were mostly of insects of little note, yet we were satisfied to know that moths were so common, and we hoped to take some good things before long.

Sunday was a day of rest. The Highland people are very strict on the observance of the Sabbath day, and as the rain was falling heavily we had no special wish to offend their Sabbatarian susceptibilities. In the afternoon I attended the service at the Carsaig Free Church, a queer old world sort of building, with a still queerer box shaped pulpit, and a small but devout congregation, many of whom no doubt had walked many miles in the heavy rain to church that day. There was a sincere air of earnestness about the worshippers that you seldom, or indeed never, find in our large city churches.

Monday turned out a very fine day. In the forenoon we paid a visit to the moor, and took a few specimens of *Davus*, but the strong wind that was blowing made it very difficult to net anything. We had made up our minds to try sugaring, but some difficulty in procuring the necessary materials, the only shop in the place not keeping treacle. A good quantity was at last procured from the inn, and this mixed with a due proportion of whisky, was our attractive composition. It was at first decided to sugar only a few trees to see if moths would come to it, and after "painting" a few trunks alongside Barmore Hill, we went along the road netting the insects as they flitted near the wood. In addition to most of those species which we took on the Saturday night, we captured *G. papilionaria* (one), a few *O. cambricaria*, *E.*

affinitata, *E. omicronata* (?), and two *C. pinetellus*. Mr. Stewart was also fortunate in taking *A. aglaia* at rest on a thistle top, which was a good proof of his excellent eyesight, as it was after 10 p.m., and quite dark. Having taken a great variety of moths, we then thought it time to pay a visit to the sugared trees, and on doing so were glad to see that a large number of moths were holding high revel round the "festive board." There were lords and commons all alike eager to share in the plenteous feast! On the few trees that were sugared we took the following specimens:—*T. batis*, *A. rumicis*, *L. impura*, *X. rurea*, *M. strigilis* (common), *N. augur*, *plecta*, *brunnea* (common), *festiva*, *baja*, *E. lucipara*, *A. herbida*, *nebulosa* (common.) From these we had a sufficient indication that sugar was fairly attractive, and we determined to give it a fair trial on the following evening, should weather permit.

Tuesday was not a very favourable day for collecting. The wind blew a perfect hurricane all day, so little was done in the way of adding to our captures. In the evening we tried Taynish road, but the only species we added to our list of captures were two geometers unknown to any of us. Mr. Stewart, in the morning took a nice specimen of *H. adusta* at rest in an outhouse.

Wednesday was a better day, and we took a great variety of species. Little collecting was done during the day, but in the evening we filled all our boxes. *C. pusaria* and *ezanthemaria* were taken in addition to almost all these species already named, and *C. margaritellus* and *tristellus* were added to our list. Sugar was again tried with some success. One visit to the "sugared" trees was productive of over sixty specimens. *Nebulosa*, *brunnea*, and *strigilis* were very common, but the great feature of the evening's work was the capture of a fine specimen of *Plusia bractea*. It was attracted by the light of the lantern, and while hovering round was cleverly netted by Mr. Stewart, who, of course was delighted with his success.

Thursday was a truly miserable day, and we had to stay indoors all day, the rain was pouring so heavily. It was not, however, altogether mis-spent, for it afforded us an opportunity of removing a great number of insects from the boards, and attending to other matters which had been neglected during the former part of the week. This rather lengthy record of our holiday was also partly written on that day, and now that I finish it at home, and read over the altogether dismal picture I draw of the cold and wet weather at the commencement, I must confess that the pouring rain had a most depressing effect upon the spirits. And no wonder! for had we not decided to accompany some friends on a delightful sail down beautiful Loch Sween, to a place called Dana, where we expected to have had some good collecting. And in the morning when we rose, the rain was pouring in torrents, and the wind

was helping it to make matters more miserable, so, of course, we did not go to Dana. We put off going till the next day, and on that day the wind was blowing a hurricane, and we have not seen Dana yet, with its adjacent island, notable for its primitive dwellings and curious crosses, and old historical traditions.

Friday, as I have already mentioned, was a very windy day, but as it was dry and the sun shining, we paid a visit to the moor. In a little patch of heath, near the Loch, we found *Davus* rather plentiful, and succeeded in netting a few. As it was rather marshy Mr. Stewart and I put off our boots, and found that we could collect much more comfortably in the marshy ground. Between us we took over fifty specimens in a very short time, besides a number of *A. fumata*, and single specimens of *P. interrogationis* and *gamma*. In the afternoon a visit was paid to a part of wooded hillside bordering Loch Sween, by means of a boat, and here we found ferns growing in great luxuriance. The royal fern, hart's tongue, maiden hair, spleenwort, and a variety of other species could be had in any quantity. A number of very fine specimens of *C. propugnata* were secured by beating the blackthorn, and some other nice species were taken. In the evening sugar was again tried with great success. We had been in the habit of dropping a little treacle on the tops of thistles, and by this means had taken a number of specimens of *Munitata*, *Immunata*, and other species. On our way home, we came to a thistle by the roadside which we had previously treacled, and on examining it with the aid of the lamp, a beautiful *Bractea* was seen, seemingly enjoying the sweet mixture. It was at once netted, and as the result of ballot it is now possessed by Mr. McGrouther. I never heard of any of the *Plusia* family coming to sugar, except perhaps *gamma*, and the fact may be worthy of mention. It is possible had we taken this specimen at sugar earlier in the week, we should have tried the thistle heads more extensively, and perhaps taken some more specimens. At least, it is worth while for those who reside in localities where this rare species is known to occur, to give this method of capture a trial. Our boxes this evening were again filled, and as we walked home in the pale moonlight, alongside Barmore Hill, and past the lake, and looked for the last time at the hills, fields, and moors, where we had spent a most enjoyable week's collecting, we all felt sorry that business could not allow our spending a longer holiday in this beautiful and romantic country.

On the morrow, with many regrets and hand-shakings with kind friends, we left Tayvallich, in the hope, however, that in the course of another year we would be back to see them all again, and to make another effort to work out the lepidoptera of this remote and almost unknown district. If this paper should appear to some readers unnessessarily long, my only excuse is

that, as almost nothing is known regarding the insects peculiar to this district, I have felt it my duty to give a detailed account of our experiences in North Knapdale, in search of insects.

78, Gloucester Street, Kingston, Glasgow.

SIX MONTHS' WORK AMONG THE TORTRICES AND TINEITES.

BY ALBERT H. WATERS, B.A., F.S.Sc., F.P.N.S., &c.

SEPTEMBER.

In September I obtain far more Micro-lepidoptera in the larval than in the imago state, for, although a few stragglers remain over from August, the number of species to be met with now in the perfect state is very much diminished. Of the tortrices, the principal moths which appear this month are *Phoxopteryx subarcuana*, *Leptogramma Scotana* and *Parisiana (scabrana)*, *Peronea mixtana*, *P. tristana*, *P. maccana* and *hastiana*.

Phoxopteryx subarcuana is a little pale grey moth, we find it occasionally but very sparingly in Cambridgeshire, in May, June, and September. It is the same size as the common *Bactra lanceolana*, which we find so abundantly among rushes in May, June, August, and September. There are little or no markings on the fore-wings, a faint waved whitish line on the inner margin, and a darker shading towards the costa being about all. It has been regarded as a variety of the more generally distributed *Phoxopteryx biarcuana*, but it is certainly distinct, for not only is the last-named species a larger moth than *subarcuana*, but it has the costal half of the fore-wings reddish brown, while in *subarcuana* the wings are of a nearly uniform pale grey colour.

Leptogramma Parisiana I have never taken, and so am unable to describe. *Peronea mixtana* is a silvery grey, chocolate streaked tortrix, very common in heathy places. *P. tristana* is a moth of variable ground colour as regards its fore-wings, but may be recognised, when seen among mealy guelder roses, by a large reddish brown triangular patch on the middle of the costa. *P. maccana* is a rare Scotch species, with which I am unacquainted. *P. hastiana* is a very variable tortrix, generally of a purplish shade, and some specimens have half the wing divided longitudinally, greyish purple, and the other half whitish ochreous; other specimens are glossy purplish brown, with a pale grey blotch near the anal angle. We find it about shallows.

There are several tortrix larvæ to be found in September, as *Cnephasia musculana*, between united bramble leaves; *Catoptria carduana*, on thistle

seeds; *Phoxopteryx mitterbacheriana*, on oak; *P. laudana*, between united leaves of bush vetch; *Stigmonota trauniana (regiana)*, under bark of sycamore; *Carpocapsa splendana*, in acorns; *C. pomonana*, in apples; *C. grossana*, in beech nuts; *C. funebrana*, in plums. and *Pythechroa rugosana*, on bryony. I am compelled to dismiss these with bare mention, as I have a long list of tineina to which I must now turn.

Last month furnished a long list of the genus *Depressaria*, and in addition to *nervosella* and *heraciella*, which still occur in the imago state, several other species of the genus are now out. *Subpropinquella* may be noticed among thistles; *capreolella* occurs in some places, but very rarely, where burnet saxifrage (*Pimpinella saxifraga*) grows; *yeatiella* should be looked for among marsh hogs-fennel (*Peucedanum palustre*); *granulosella* is reputed to occur on the sea coast about Deal, and *rotundella* and *depressella* are also south coast insects. The last named may perhaps be met with by collectors in Kent and Hampshire, among carrots and parsnips. *Pimpinella* should be sought for wherever burnet saxifrage grows. *Ultimella* and *pastinacella* likewise occur now in the perfect state. The last named is the largest but one of these little moths, and is only surpassed in size by *heraciella*. It expands very nearly an inch, while *heraciella* often slightly exceeds it. In colour it is pale greyish fuscous, with four blackish spots on the disk of each fore-wing, two of which are before the middle and two are beyond it, there is also another on the fold before the central portion of the wing. The fore-wings are rather narrow in shape. *Ultimella* is about two lines and a half smaller. The fore-wings are greyish fuscous, with a reddish tinge, and have many longitudinal dark fuscous coloured streaks; the hind-wings are whitish grey. *Subpropinquella* is rather larger, expanding ten lines, and the fore-wings are rather elongate in shape. The colour is brownish ochreous, and there are two black dots on the disk before the middle and a small fuscous coloured blotch. *Capreolella* I am not well acquainted with, I have never taken it, and all I can say about it is, that it is a very small ochreous coloured moth, expanding not more than half-an-inch; the larvæ feeds in June, on the radical leaves of the burnet saxifrage. *Yeatiella* we find in the Cambridgeshire fens, but not abundantly. It is just a trifle smaller than *subpropinquella*, and is pale greyish ochreous in colour. There are two black dots and a fuscous coloured blotch, and also a white dot on each of the fore-wings, and there is also a dark streak from the inner margin, not far from the base. I have no personal acquaintance with *granulosella* or *rotundella*. *Depressella* is a small reddish brown moth, with a pale yellow head. Each fore-wing has a pale yellowish angulated fascia growing indistinct towards the costa, and there is a large pale yellowish spot on the inner margin beyond the middle,

Pimpinella is about a line larger, expanding eight lines or rather more. It is a fuscous coloured moth, inclining to reddish towards the costal margin, with a number of short dark streaks on the fore-wings, two of which are conspicuous. All these moths have moderately long reflexed labial palpi. The second joint is brushlike underneath, and the terminal one slender. They have very flat abdomens, whence their name "flat-bodies." In some respects they greatly resemble the tortrices, and their larvæ are also very similar, but unlike the little caterpillars of the tortricina they are hatched from the egg in the spring or early summer, and produce moths in the latter part of summer. The moths generally hibernate and may often be seen in early spring. They seem to be very fond of getting in thatch, whence they may be readily beaten. *Assimilella* unlike the other *Depressaria* larvæ is hatched from the egg in the autumn and hibernates very small. In early spring it may be found as a little brown caterpillar with a black head, feeding between united broom twigs.

The genus *Gracilaria* furnishes us with several species this month. The moths belonging to this genus and to the family of which it is a type, are very easy to recognise from the habit they have of sitting with their heads raised when in repose. Both the antennæ and the maxillary palpi are rather long, the former being as long as the fore-wings. The palpi are slender, and the labial palpi have the terminal joint pointed. The fore-wings are elongate and possessed of long fringes, the hind-wings are lanceolate in shape. The genus is divisible into two great groups, viz. large species and small species. To the former belong the willow haunting *Stigmatella*, which we may find in September, both as larva and imago, and also the autumn species, *stramineella*, *hemidactylella*, *falconipennella*, *semifasciella*, *populella*, and *elongella*. All these exceed five lines in expanse. *Stigmatella* is a reddish brown moth, with whitish yellow triangular marks on the costal margin. It is produced from a greenish white larva, with a yellowish brown head, living in a cone on willow or poplar. It hibernates in November, and is fond of getting in stacks or thatch. It reappears in the latter end of March or beginning of April. We find it in the Cambridgeshire fens, but it is not very plentiful. It has a wide range and occurs, I believe, in every part of England. *Stramineella* is a northern species, in colour it is very pale yellow with reddish brown dots. *Hemidactylella* and *falconipennella* I have never taken, and the latter species is I believe but seldom met with. *Semifasciella* is a moth which varies to some extent in colour. Some specimens are reddish brown, or nearly so, others have reddish-brown mottlings on a pale yellow ground colour. In all I have seen, there is pale yellow streak extending from the costa obliquely, anterior to the middle, and reaching as far as the fold, while the costal margin

itself is dotted with little black spots. The moths should be looked for about maple trees. *Populella* I have never taken. *Elongella* expands about seven lines, it is a little reddish ochreous coloured moth, with a not very distinct triangular shaped mark on the costa, just a little paler than the ground colour of the wing. It may be found about alder trees, in June and September; the larva rolls up the leaves lengthwise in May and July. It is a generally distributed species.

Turning now to the second group of the genus *Gracilaria*, we find the smaller species, viz. those under five lines—represented in September by three species. The first of these, *phasianipennella*, is the largest of the three, and is indeed, scarcely smaller than *semifasciella*. It has shining brown forewings with white or whitish spots, two of which are on the inner margin, and three on the costa: sometimes these last are very indistinct. The moth may be obtained by sweeping herbage, in the localities where it occurs. The larva feeds in August and early part of September, on biting pericaria (*Polygonum hydropiper*) and sorrel. It has a yellowish-brown head with four black spots, and a greyish coloured body, and lives in rolled up sprigs of its food plant. The other species are *auroguttella* and *ononiella*. The former is a dark bronzy grey moth, with four golden yellow spots on its forewings. It is double brooded, the first brood appearing in May from larvæ feeding in the preceding September and October, the other emerging in July from larvæ feeding in June. These larvæ live in cones on leaves of St. John's Wort; they are whitish green, with pale brown heads. *Ononiella* is a small dark brown moth, with silvery spotted wings. It may be obtained sparingly by sweeping clover throughout the summer.

Besides the above, two other species of the family *Gracilariidæ* may be looked out for by the micro-lepidopterist in September and October. They belong to the genus *Coriscium*, the moths belonging to which have the second joint of their labial palpi furnished with a projecting tuft of hairs. *Cuculipennella* makes cones on privet leaves in August, from which the pale grey fuscous-clouded moth emerges in September, and hibernates in November, reappearing the following spring, *citrinella* is a sulphur coloured moth, which occurs in the New Forest and other places in the autumn, and like *cuculipennella* hibernates in the winter. Besides these two, the greyish-brown *Brongniardella* occurs about oak trees, from July to October.

There are one or two other tineites occurring in the autumn, such as *Laverna decorella*, *Phyllocnistis sufusella*, and *P. salignella*, but I have such a long list of larvæ to mention, that I am unable to say more about the imagines.

Diurnea fagella is sure to be found between united beech, and other leaves

in September and October. It is a greyish green sixteen legged caterpillar, with a yellowish head. The third pair of legs is club-shaped. *Epigraphia steinkellneriana* feeds between turned down leaves of hawthorn, in August and September. *Tinea bistrigella* may be found in a large blotch on birch leaves. *Adela fibulella* lives in a flat case on Germander speedwell, *Swammerdamia casiella* makes a web on hawthorn leaves as does also the yellow *S. pyrella*, which latter also feeds on apple and pear trees. *Plutella xylostella* feeds on turnip and cabbage leaves. *Enicostoma lohella* turns down sloe leaves. *Gelechia acuminatella* mines the leaves of thistles. *G. notatella* unites sallow leaves. *G. scriptella* turns down maple leaves. *G. triparella* unites oak leaves. *Acophora flavimaculella* feeds on the seeds of wild angelica. *Æ. similella* should be sought for under the bark of dead fir-trees, in the north; and *Atemelia uorquatella* may perhaps be met with in the same localities, in birch and elm leaves. *Gracillaria Swederella* makes cones on oak leaves. *Coleophora paripennella* makes a case on hawthorn and sloe, which lies flat on the leaf; we may also find it on rose and bramble. *C. lari-cella* makes a case on larch (see the coloured plate with the *Young Naturalist* for September, 1884.) *C. therinella* we find in a long whitish case on thistle leaves, but it is far from common. *C. argentula* makes a short whitish case and feeds on the seeds of yarrow (*Achillea millefolium*.) *C. virgaureella* makes a small cylindrical brownish case, and feeds on the seeds of golden rod. *Bedellia somnulentella* mines convolvulus leaves. *Laverna Hellerella* lives in hawthorn berries, and *Tischeria complanella* makes whitish blotches on oak leaves.

Of the genus *Lithocolletis*, we have quite a long list. On oak we find mines of *roborella*, *amyotella*, *hortella*, *Cramerella*, *Heegeriella*, *irradiella*, *lautella*, *quercifoliella*, and *Messaniella*. On maple we have *acerifoliella* (figured in the coloured plate with the *Young Naturalist* for July, 1884.) On hornbeam, *tenella* (underside), and *carpinicolella* (upperside.) On alder, we have *alnifoliella*, *Frolichella* and *Klemanniella*, mining the underside of the leaves, and *Stettinella* mining the upper side. On birch we have *ulmifoliella* (see plate with Y.N., September, 1884), and the scarce *castella*. On sallow, we have *spinolella*, *salicicolella* (see plate July, 1884), and *viminiella* (ibid). On osiers, we have *viminetella*, which will be found figured on the same plate as the two preceding species. On hawthorn, we have *pomifoliella* (and apple), *corylifoliella* (see plate with Y.N., September, 1884, and the northern *Caledoniella*. Both these last two mine the upper side of the leaves, while the first-named mines the underside. They all three seem to be scarce in the South of England. Besides these we have *Corylella* and *Niceliella* mining nut leaves; *schreberella* (see plate with Y.N., September, 1884) and

tristrigella mining the underside of elm leaves; *spinicolella* mining sloe; *emberizæpennella* and *trifasciella* mining honeysuckle; *faginella* in the underside of beech leaves; *bremiella* in bush vetch leaves, and *torminella* in the underside of leaves of *Sorbus torminalis*.

Among the other leaf-mining larvæ, which we find in September, are the pale green *Syonetia Clerckella*, which makes long serpentine galleries in leaves of apple and cherry trees; the greenish white *Cemiostoma laburnella*, which we find in large pale blotches on laburnum leaves; *C. scitella*, which makes flat brown blotches on apple and hawthorn; and several members of the genus *Nepticula*, which make long slender galleries or small blotches in various leaves, as *atricapitella* and *subbimaculella* in oak, *pygmæella* and *oxyacanthella* in hawthorn, *viscerella* in elm, *anomalella* in rose leaves, *catharticella* in buckthorn leaves, *trimaculella* in poplar, *floslactella* in nut and hornbeam, *luteella* and *argentipedella* in birch, *tityrella* in beech, and *plagi-colella* in sloe.

Cambridge.

A FUNGUS FORAY.

With the advent of autumn, the naturalists' attention is claimed by those wonderful creations of nature, the Fungi; and, though the number of those interested in this study is limited, compared with other branches of natural history, we think that the following short account of the last annual Fungus Foray, by members of "The Hackney Microscopical and Natural History Society," will be of interest to many of our subscribers. The Foray was held in Epping Forest, on Saturday, October 24th, 1885. The route being from Chingford, through the Green Ride and High Beech to Loughton, and from thence to Fairmead Lodge. Although the weather was unfavourable the attendance was fairly good. The President, Dr. M. C. Cooke, M.A., L.L.D., A.L.S., an eminent authority on Fungi; Mr. George Masee, Mr. H. Cole, Hon. Sec. to the Essex Field Club, and other scientific gentlemen were with the party. The way led through forest scenery of great beauty, many objects of interest were pointed out, the Fungi being the speciality of the Foray claimed the greatest attention. The finds were very numerous, as will be seen by the subjoined list:—

<i>Agaricus (Amanita)</i>	..	<i>phalloides, muscarius, rubescens, pantherinus, vaginatus.</i>
„ (<i>Armillaria</i>)	..	<i>melleus, mucidus.</i>
„ (<i>Sepiota</i>)	..	<i>procerus, granulosus.</i>

<i>Agaricus</i> (<i>Tricholonia</i>)	..	<i>sejunctus, saponaceus, nudus, personatus.</i>
.. (<i>Clitocybe</i>)	..	<i>clavipes, brumalis, metachrous, ditopus, nebularis, laccatus.</i>
.. (<i>Collybia</i>)	..	<i>radicatus, butyraceus, maculatus.</i>
.. (<i>Myцена</i>)	..	<i>purus, galopus, pullatus, galericulatus, ammoniacus, alcalinus, epipterygius, filopes, capillais.</i>
.. (<i>Pleurotus</i>)	..	<i>ostreatus, dryinus.</i>
.. <i>Pluteus</i>	..	<i>cervinus</i>
.. (<i>Entolonia</i>)	..	<i>sinuatus.</i>
.. (<i>Pholiota</i>)	..	<i>radicansus, *verruculosus.</i>
.. (<i>Hebeloma</i>)	..	<i>crustuliniformis, mesophæus.</i>
.. (<i>Crepidotus</i>)	..	<i>variabilis.</i>
.. (<i>Tubaria</i>)	..	<i>furfuraceus.</i>
.. (<i>Psalliota</i>)	..	<i>campestris, sylvaticus.</i>
.. (<i>Stropharia</i>)	..	<i>aeruginosus, semiglobatus.</i>
.. (<i>Hypholoma</i>)	..	<i>fascicularis, sublateritius, udus, velutinus.</i>
.. (<i>Psilocybe</i>)	..	<i>semilanceatus, spadiceus.</i>
.. (<i>Panæolus</i>)	..	<i>separatus, campanulatus.</i>
<i>Coprinus</i> ..	..	<i>comatus, deliquesceus, micaceus, niveus, plicatilis, atramentarius.</i>
<i>Cortinarius</i> (<i>Phlegmacium</i>)	..	<i>*varius, purpurascens.</i>
.. (<i>Inoloma</i>)	..	<i>*argentatus.</i>
.. (<i>Myxaciium</i>)	..	<i>elatior.</i>
.. (<i>Dermocybe</i>)	..	<i>ochroleucus, cinnabarinus.</i>
.. (<i>Telamonia</i>)	..	<i>hinnuleus.</i>
.. (<i>Hydrocybe</i>)	..	<i>*saturninus.</i>
<i>Paxillus</i> ..	..	<i>involutus.</i>
<i>Hygrophorus</i> ..	..	<i>virginæus, coccineus.</i>
<i>Lactarius</i> ..	..	<i>clennius, quietus, vellereus, mitissimus, subdulcis, camphoratus.</i>
<i>Russula</i> ..	..	<i>nigricans, rosacea, depallens, rubra, vesca, cyanoxantha, fellea, emetica, ochroleuca, fragilis, alutacea, lutea.</i>
<i>Cantharellus</i> ..	..	<i>aurantiacus.</i>
<i>Marasmius</i> ..	..	<i>androsaceus, Hudsoni.</i>
<i>Boletus</i> ..	..	<i>badius, chrysenteron, subtomentosus.</i>
<i>Polyporus</i> (<i>Merisma</i>)	..	<i>giganteus.</i>
.. (<i>Anodermei</i>)	..	<i>adustus,</i>
.. (<i>Inodermei</i>)	..	<i>versicolor.</i>
.. (<i>Resupinati</i>)	..	<i>vaporarius.</i>
<i>Stereum</i> ..	..	<i>hirsutum, purpurenm.</i>
<i>Radulum</i> ..	..	<i>fagineum.</i>
<i>Clavaria</i> ..	..	<i>cinerea, cristata, fragilis.</i>
<i>Tremella</i> ..	..	<i>albida.</i>
<i>Lycoperdon</i> ..	..	<i>gemmatum.</i>
<i>Phallus</i> ..	..	<i>impudicus.</i>

<i>Sepedonium</i>	..	..	<i>chrysospermum.</i>
<i>Bulgaria</i>	..	..	<i>sarcoides, inquinans.</i>
<i>Xylaria</i>	..	..	<i>hypoxydon.</i>

Species recorded for the first time as occurring in the Forest district marked thus *

One cannot but be struck with the great wealth of species found. Of the above fungi there are very many that are not only edible and harmless but are quite equal in flavour and nutrition to the so-called common mushroom, yet how few know anything of them. There is hardly a more delicious dish than a good juicy "Fistulina hepatica." (beafsteak mushroom) or "Coprinus comatus" (inky mushroom) though one need scarcely say a proper compliment of rump steak is an addition if not an improvement to both. We cannot but congratulate this flourishing Society upon the success attending their efforts and trust that this season's foray will prove even more productive.

THE ORIGIN OF APTEROUS FEMALES.

By F. N. PIERCE.

I am much interested in the origin of Apterous Females, and though I am not able to offer any suggestions towards elucidating it, I give a few facts which may perhaps assist others in doing so.

In the "Intelligencer," of 1856, page 132, we find Mr. Wildman captured a specimen of *Macaria Notata* at Wickham, he says "the left hind wing entirely wanting, though I can just trace a sort of projection where it should have been."

The first specimen that came under my notice was *Hybernia defoliaria*, which emerged from a found pupa, with the left wing entirely absent, the next year I bred another, also from a found pupa, with the same wing absent. About two years after Mr. Walker bred another specimen of the same insect, from a found larva with the right hind wing wanting, and next year he bred a female *Orgyia fascelina*, reared from the larva, without the left hind wing, I also found about two years ago, a male *Nyssia zonaria* without the left hind wing. These are all the instances which have come under my notice, although I have bred hundreds of Lepidoptera with all sorts of deformities. The curious part is that four of the species have apterous females, while another *O. fascelina*, I believe, scarcely if ever flies, at any rate I have never seen it on the wing, or even found an imago, though I have searched where the larvæ were common enough. The remaining one is *M. notata*, my little experience of which is that it is an active insect on the wing.

We constantly find the male *N. zonaria* with the hind wings very much

deformed, sometimes both. The above case is the only one I have come across, like those I have mentioned with the wing entirely absent, by which I mean quite invisible to the naked eye.

I should think much more information might be obtained from the coleopterists, who have so many semi-wingless females, but, I am not sufficiently acquainted with them to know, if the wingless ones occur about winter the same as the moths, or if there are other conditions which would tend to make their wings of no use to them. It is also curious to note that five out of the six cases it is left wing that is wanting.

Liverpool, 12th August, 1886.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

August 4, 1886.—Prof. J. O. WESTWOOD, M.A., F.L.S., Hon. Life President, in the chair.

The following gentlemen were elected Fellows, *viz.*: Lord Dormer, Mr. J. H. A. Jenner, Mr. James Edwards, Mr. Morris Young, Mr. F. V. Theobald, Mr. E. A. Atmore, and Mr. William Saunders, President of the Entomological Society of Ontario.

Mr. Theodore Wood exhibited and made remarks on the following Coleoptera, *viz.*:—An abnormal specimen of *Apion pallipes* (Kirby), with a tooth upon the right posterior femur: a series of *Langelangia anophthalmi* from St. Peter's, Kent, taken in decaying seed potatoes; a series of *Adelops Wollastoni* (Janson), and *Anommatus 12-striatus*, also from decaying seed potatoes; and a series of *Barypeithes pellucidus* (Boh.), from the sea-shore near Margate. Mr. Wood also exhibited, on behalf of Dr. Ellis, of Liverpool, a specimen of *Apion annulipes* (Wenck).

Prof. Westwood exhibited five specimens of a species of *Culex*, supposed to be either *C. cantans* or *C. lateralis*, sent to him by Mr. Douglas, who had received them from the Kent Water Works. It was stated that they had been very numerous in July last, and that persons bitten by them had suffered from "terrible swellings." Prof. Westwood also exhibited some galls found inside an acorn at Cannes in January last.

Mr. Billups exhibited a male and female of *Cleptes nitidula* (Latr.), taken *in copula* in July last, at Benfleet, Essex, on the flowers of *Heracleum sphondylium*. He stated that it was probably the rarest of the twenty-two known species of British *Chrysididae*, though it had been recorded from the New

Forest and from Suffolk. Prof. Westwood, the Rev. W. W. Fowler, Mr. Fitch, and Mr. Champion, made some remarks on the species.

The Rev. W. W. Fowler announced that a series of specimens of *Homalium rugulipenne* (Rye) had been received from Dr. Ellis, of Liverpool for distribution among members of the Society.

Mr. White exhibited a group of three specimens of *Lucanus cervus*, consisting of a female and two males. The female was *in copula* with one of the males, which, while so engaged, was attacked by the second male.

Mr. E. A. Fitch read a paper, communicated by Mr. G. Bowdler Buckton, "On the occurrence in Britain of some undescribed *Aphides*." The paper was illustrated by coloured drawings.

Prof. Westwood read a paper "On a tube-making homopterous insect from Ceylon."

Mr. Theodore Wood read a paper "On *Bruchus* infested Beans." A discussion ensued, in which Prof. Westwood, the Rev. W. W. Fowler, and Messrs. Weir, Fitch, Trimen, and others took part.—H. Goss, *Secretary*.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The usual monthly meeting of the above Society was held in the class-room of the Free Library, William Brown Street, the President (Mr. S. J. Capper, F.L.S.) in the chair. Amongst the objects of interest exhibited during the evening, were two specimens of a caterpillar brought from New Zealand by the Rev. J. W. Walker, and presented to Mr. S. J. Capper. These animals are called by the natives "Aweto," and form the root of a bulrush (*Sphæria robertsia*). This singular arrangement comes pass in the following fashion. When the caterpillar buries itself in the ground to pass into the chrysalis stage, the minute spores of the fungus* find lodgment in the neck plates of the caterpillar. There they vegetate, and strike root inside the horny case of the animal, living on its tissues. The animal dies, forming simply a root for this plant, which thus lives on flesh. The bulrush attains a length of about ten inches, its apex in a state of fructification, resembling the common club-headed bulrush of our own ditches. When fresh these plants taste like a nut, and are eaten by the natives, who also burn them and use them for tatooing. When newly dug up, the caterpillar's body is soft, and on being divided longitudinally the intestinal channel is plainly seen. The vegetating process commences during the life of the caterpillar, for decomposition has not set in, nor is the skin expanded or contracted in any way. This forms one

*We print this report as it reaches us, but the bulrush is not a fungus.

of the extraordinary freaks of nature in the connection between animal and vegetable, and is perhaps unequalled in the annals of biology. Another strange phrase of animal life was shown, in spirits, in the shape of a fly carrying off a large spider! This was captured in the very act in Entre Rios, S. America. The spider was a large, strong, dark-bodied animal, looking like a trap-door spider, one of these highly-organised and exceedingly clever builders of which there is such a fine collection in the Liverpool Museum. The fly is a strong and savage-looking insect, much smaller than the spider, but when captured it was dragging the spider *up* the glass of a window. This seems to reverse the ordinary course of nature, and somewhat spoils the familiar story of the "Spider and the Fly." Mr. Frederick Taylor, of Rainhill, presented this strange couple, and it is owing to the same gentleman's interest in the spider family that the Liverpool Museum has the finest collection of trap-door spiders and their houses of any museum in the kingdom. Besides these specimens, there was a large glass jar standing on the central table, such as is commonly used for an aquarium, and in this there was prisoned an enormous beetle. It was four or five inches long, with a pair of giant horns and dangerous-looking mandibles. It was feeding quietly on a faded banana, and seemed quite at home. In spite of its ferocious look, it is a vegetarian, and, in the larval stage, feeds on decaying vegetation, while in the adult form it lives on fruit. This also came from South America, and has been kept alive since June last. It is the first of the kind ever kept alive in this country, and is an object of great interest to all comers. It is called *Dynastes typhon*, or, more familiarly, the elephant beetle. In our museum, where it is now on view, it is more commonly known as Jumbo. It is a most extraordinary sight in this English climate, where the members of the beetle family are small. Dr. Ellis exhibited a case of beetles just received from Illinois, U.S., which are particularly interesting from an economic point of view, if not from an entomological one. They belong to the *Phytophagous lamellicornia*, and have played havoc with the harvests in the western part of America. Sometimes they come flying into an orchard during the night, and in the morning there is not a green leaf to be seen. At times they destroy even the trees. The larvæ are deposited in the grass, and when they become active, about the month of May, the turf can be rolled up like a carpet, leaving exposed the millions of larvæ which have destroyed its roots. The exhibits of the evening were of an exceedingly interesting character, and the society has evidently done much good work. The paper of the evening was by Mr. S. L. Mosley, a gentleman well known throughout the entomological circles of the country, and particularly in Huddersfield, where his efforts to educate the children in scientific things are fully appreciated. In the paper Mr. Mosley attempted

to show the necessity existing for a more definite classification than we have at present in entomology. All the variations from the type which is generally considered specific should be ranged under one of four groups, and the names used for those groups should not be used indiscriminately, as now. That terms are too loosely used at present is admitted by all, and a reformation in scientific nomenclature is greatly needed. The groups suggested are— A, *Race*, as applied to a geographical or altitudinal form of a species. B, *Variety*, to be used only for those forms which occur only more or less commonly with the type form, but which are recurrent, and should therefore receive distinct names, in addition to the specific ones. C, *Aberration*, a departure from the type in colour, but not recurrent. And D, a *Monstrosity*, which is a departure from the type in form, but which is not recurrent. The two latter forms would not receive different names. The writer proved his case fairly well, and all true students must deplore the evident tendency to the multiplication of names and the creation of new species and varieties.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

At the Meeting of August 5th, many interesting exhibits were on the table, among which may be mentioned a very beautiful var. of *V. urticae*, having some spots absent and others confluent, bred by Mr. Grey, of Redhill; a long series of *Timandra amataria* bred from ova by Mr. Hockett; a very large male specimen of *T. betulae* by Mr. Gurney; ovæ of *A. galathea* by Mr. Pearson; a large female *N. trepida* from Shirley, by Mr. Jarvis; a series of *H. dysodea* by Mr. Clark; also two fine specimens of *Xestobium tessellatum* (the Death Watch beetle), from Willows at Sunbury, four *Cionus verbasci*, four *C. scrophulariae*, and five *C. blatteriae*, from *Scrophularia aquatica* at Farnham, by Mr. Lewcock.

On the 12th Mr. Jobson exhibited bred specimens of *E. venustula*, and *L. sexalata*, and some splendid bred *G. smaragdaria*; Mr. Clark shewed two *A. athalia* and four *M. flammea*.

A discussion on the habits of *S. tithonus* was brought forward by Mr. Pearson, and continued by Mr. Eedle who gave interesting details of the larvæ.

[The report of the meeting on August 19th has not reached us at the time of going to press, owing to the absence of the Secretary.]

PUBLICATIONS RECEIVED.

Seventh Annual Report of the "Isle of Man Natural History and Antiquarian Society."

This report contains the President's annual address, which gives quite a

resume of matters connected with the Isle of Man. The Society, which numbers 87 members, devotes itself chiefly to the Natural History and Antiquities of the Island, an example that cannot be too strongly recommended for all local societies. Among the papers that have been read during the preceding year, we find the following relating to Natural History:—

Notes on the Mammals of the Isle of Man.

Manx Butterflies.

An introduction to the study of the Lichens in the Isle of Man.

A paper on local Geology was also read, entitled "The necessity for collecting and arranging the ascertained facts relative to the glaciation of the Isle of Man."

Three papers on Local Antiquities, and one on Botany, complete a very interesting list. It is to be regretted such societies as this are not able to print the more interesting of the papers read at their sessions. What entomologists know of the insect fauna of that island makes us but too anxious to learn more, and a collector from this country, paying an occasional short visit there, cannot possibly learn as much as those who are constantly on the spot. The President says:—

"Above all, we felt it to be our duty as Manksmen, to complete and set on record an accurate account of the Natural History of our Island, in order that expert Scientists might have trustworthy information thereon, and be enabled to generalize and to draw their own valuable and most interesting deductions."

This is exactly what we think, but where are these records? The paper on Manx Butterflies for instance, how can we obtain a perusal of it? When Societies cannot publish papers like this themselves, they should offer it to one of the many magazines that are now published. We would gladly find room for such a paper in our columns. Mr. Kernsode does all that can be done in a President's address to cover the whole ground, but only specialists can give sufficient detail to enable "expert scientists" to draw valuable deductions.

Report on the Actiniaria of the L. M. B. C. District, by Dr. Ellis, F.E.S.

This interesting little pamphlet is from the Liverpool Marine Biology Committee's Report, No. 1, 1886, and shows considerable energy and work on the part of the Committee. It contains particulars of seventeen species of ACTINIARIA, known to inhabit the Liverpool Bay district, out of twenty species recorded by Gosse as being found in the Irish Sea. It confirms, from the observations of the Committee, many of the localities given by Gosse twenty years ago, and adds new localities for some of them. No species is recorded as new to the district, but a new variety of *Cylista undata* is described

and figured, for which Dr. Ellis proposes the name *Candida*. He describes it as follows:—

COLUMN.—Capable of great elongation, pale drab, with darker longitudinal lines at the base, disappearing at about half the height.

DISC.—Pure opaque white, the radii not indicated; the extreme margin of the disc is translucent purple.

MOUTH.—Concolorous with the disc, slightly elevated on a cone.

TENTACLES.—Not very numerous, in about five rows, the inner ones being longest. All are pellucid grey, tipped with opaque white; the inner row, six in number, have a dark purple longitudinal stripe on the face and back; the remainder have similar stripes of scarlet, the whole of the base of the tentacle being suffused with the same colour as stripe. Near the foot of the inner tentacles only is a faintly indicated dark cloud, representing the B mark of the typical form of this species.

HABITAT.—Hilbre Island, at the extreme north extremity, near low-water mark.

NOTES ON LEPIDOPTERA.

By B. LOCKYER.

(Continued from Page 165.)

SMERINTHUS OCELLATUS.—Larvæ near Knight Wood, New Forest. Aug.

M. FUCIFORMIS.—Not very common, at end of May. Buzzing at flowers, rhododendron said to be a favourite. Saw a fine set said to be from Minstead, New Forest.

M. BOMBYLIFORMIS.—Same locality as preceding.

TROCHILIUM MYOPIFORMIS.—May and June. May be looked for at rest on windows and walls in the vicinity of its food-plant. Camden Town. Rare.

T. TIPULIFORMIS.—Ditto. and buzzing about currant bushes by day.

ZENZERA ÆSCULI.—But too common at rest at the tops of affected boughs of elm trees, &c. July and August, about Tufnell Park, London, &c.

COSSUS LIGNIPERDA.—Same localities as last, but chiefly affecting willow,

HEPIALUS HECTUS.—Buzzing over *Pteris aquilina* at dusk. Highgate, Hampstead, and New Forest, in May and June.

H. LUPULINUS.—Fields and rank pastures. Hovering over herbage at dusk, and at rest on palings by day. Highgate and other parts of northern suburbs in May and June.

H. HUMULI.—Pastures and waste places. The male hovering at dusk, the female later in the evening. A good way to take them is to go round with a lantern after the male has ceased flying, when couples may be found in copula on the leaves of weeds (or rather underneath them.) June and July, near London.

LIMACODES TESTUDO.—July. By beating boughs. Denny Wood, New Forest; Larva at Darenth Wood, Kent. Rare.

PROCRIS STATICES.—June. Used to abound in a rank pasture near Bishop's Wood, Hampstead, fluttering about the herbage by day.

ZYGÆNA FILIPENDULÆ.—June. Used to abound on the railway near Barnet (Herts.)

NOLA CUCULLATELLA.—May and June. At rest on leaves of apple, in gardens near London.

HALIAS PRASINANA.—Used to take this species by beating among clumps of Birch. May and June. Hampstead and Highgate Woods.

H. QUERCANA.—Hadley Wood, Southgate (Middlesex), &c. The larva in May on oak. Not common.

CALLIGENIA MINIATA.—July and August. By beating oak by day and by mothing in woodland paths, where it "skips" along at some height from the ground about dusk. Bishop's Wood, Hampstead, not common; New Forest, common but rather local.

LITHOSIA MESOMELLA.—July. Flies with the same uneven undulation as the preceding, but about three feet from the ground, over heather, at dusk. Always in woods as far as my experience goes; not common and very local in different parts of the New Forest.

S. AUREOLA.—May. By beating undergrowth of oak or beech; the pretty larva to be taken full fed in the same way in August and September. Not common. Bishop's Wood, Hampstead (once) and Pond Head enclosure, New Forest.

L. HELVEOLA (DEPLANA).—July. At sugar and by beating oak and beech; larva on lower boughs of same, May and June. Woods in New Forest.

L. COMPLANULA.—July and August. At sugar, also by beating; larva on lichens or beech, &c. May and June. Woods, New Forest.

L. COMPLANA.—July. By beating young fir-trees on heaths, near Wimborne, Dorset.

L. QUADRA.—July and August. At rest on trunks of oak, &c., at some height from the ground: Also at sugar rather late in the evening. In the New Forest it is usually said to be obtained by breeding. In Denny Wood you may be pretty sure of the larva by beating oak and beech in May and June, and it is said to be obtained yet more plentifully by scaling the trunks, and by searching for the pupa under lichen and moss.

EULEPIA CRIBRUM.—Taken by day in July, darting with great rapidity hither and thither over heather. The flight between each resting place is

taken in a straight line of many yards, and it is off like the wind, before you are up with it. So a straight aim is necessary as it darts up before you. Near Wimborne, Dorset.

EUCHELIA JACOBÆÆ.—Larvæ abundant on ragwort. Braunton Burrows, near Barnstaple, N. Devon, August, 1865; and near Belton, Suffolk, August, 1869; also near Lyndhurst, every season.

CHELONIA VILICA.—Larvæ used to be common near Kensal Green, Middlesex; on chickweed (*Alsine media*.) Often seen itself on palings along the high road, a little way above the food plant. April and May.

ARCTIA MENDICA.—Once took a female flying amongst undergrowth by day, in Bishops Wood, Hampstead. June.

LIPARIS SALICIS.—Used to be common about North London, the larva to be seen sunning itself in numbers all up the trunks of almost every poplar, in May and June.

D. MONACHA.—At rest on boles of oak, about 7 or 8 feet from the ground at least. July and August. Woods in the New Forest, chiefly Denny Wood. Females readily lay in confinement. Specimens differ in the comparative preponderance of black markings.

ORGYIA PUDIBUNDA.—At rest on palings, near the top. May and June. Also by mothing. In and near woods, Hampstead, Highgate, and New Forest. The larva was excessively common in August, 1884, near Lyndhurst, especially in Hurst Hill inclosure.

DEMAS CORYLI.—By beating beech. Has it been previously noted that while larvæ from Rannoch are full-fed in September, and the resulting imagines emerge in May or June, New Forest larvæ are full-fed in May or June, and the perfect insects emerge in July and August? I have had one or two larvæ from Lyndhurst, and in 1874, about the end of August, captured a fine female in the way noted above.

TRICHIURA CRATÆGI.—Larvæ in June, near Southgate, Middlesex. Not common.

PÆCLOCAMPA POPULI.—Larvæ in woods in the New Forest. May and June.

BOMBYX RUBI.—North Devon, moors and lanes near Whitby, Yorkshire (common as larvæ, August), and New Forest (not common.)

B. QUERCUS (CALLUNÆ).—Larvæ common on the moors, near Whitby, Yorkshire, August, 1866.

B. ROBORIS (QUERCUS).—North Devon (larvæ) and Heaths in New Forest. May. Females by assembling.

ODONESTIS POTATORIA.—July. Indifferently a hedgerow and woodside species; always found but is rather local. The larva is very difficult to rear, and like *Bombyx rubi*, scarcely ever battles successfully with the perils of hibernation. It is still quite small at the end of April, and is best taken at the beginning of June. Southgate, Highgate, &c. (Middlesex), Yarmouth.

SATURNIA CARPINI.—Taken by assembling on Shirley Heath, Surrey, and in the New Forest. April and May. Found the larvæ common on the Yorkshire moors, August, 1866.

UROPTERYX SAMBUCATA.—July and August. Found everywhere in gardens, woods, and hedgerows. The male is a lofty and erratic flier. Both the larva and perfect insect may be taken by day, hiding underneath ivy leaves; the latter attached by its claspers to the leaf-stalk, its body held slanting downwards in a loose curve. It should not be kept in a cage covered with lino, as it will inevitably chew up the lino to form its peculiar cocoon, always hung by four or five threads from its food plant. The pupa is large, very lively, and pinkish ochreous, dotted and striated with pale smoke colour. The ova (long ovals of a lemon yellow) are deposited in small numbers, usually in rows, on the upper side of the leaves of the food plant. They turn bright orange chrome before hatching. Hardly any shrub in the garden comes amiss to the larvæ, even laburnum is attacked by it. When young, like most *Geometræ*, it is very fond of indulging in long races after nothing, and frequently depends by threads from the twigs of the food plant during the day-time. It only feeds at night or in the early morning. May.

EPIONE ADVENARIA.—Rare. Flying about bramble, in Park Ground inclosure, New Forest. May.

VENILIA MACULATA.—By beating undergrowth by day. Common at West Wickham, not so common near Lyndhurst. May.

METROCAMPA MARGARITATA.—By mothing and on gas lamps, at the end of June and beginning of July. Woods and their vicinity (Middlesex and New Forest). Flies rather high, and is of course a conspicuous object on the wing.

(To be continued.)

COLLECTING AT LOCH FYNE, ARGYLLSHIRE, IN JULY, 1886.

By A. ADIE DALGLISH.

The entomologist who has time to spend a week or two at Tarbert Loch

Fyne will be rewarded by taking a good variety of insects. The surroundings of the east and west lochs afford two distinct kinds of cover. At the east loch, where the village is situated, the hills are very rugged, and about the bottom are covered whins and brackens. On the point opposite the quay, called the "white shore, I spent most of my leisure time collecting. The following is a short description of what I took at this place. *Hepialus lupulinus* and *velleda* flying about dusk, and a little later *H. humuli* would make its appearance. While walking through the heather, in the forenoons, I took three of *Euthemonia russula* and one of *Bombyx quercus*. Several times I noticed two or three of *Argynnis aglaia* flying about, but they would never settle, and it was useless to chase them, because of the strong wind that was blowing. On the heather I took *Eupithecia satyrata*, *E. nanata*, *E. rectangularata*, *E. minutata*, and one of *E. centaureata*. These little moths have a curious fashion of fluttering their wings while resting on the heather. *Pidonia atomaria* was still on the wing, but in a wretched condition. I also took *Melanippe montanata*, *Camptogramma bilineata*, *Larentia didymata*, *Cabera exanthemaria*, and a few specimens of *Acidalia fumata*. While walking through the heather I captured a good number of *Anarta myrtilli*. This insect has a curious style of flight. It will rise off the heather and then dash and circle about at an amazing rate, leaving me undecided whether to stand still or give chase. What I did was to stand and watch it closely till it alighted, then creep cautiously up to the spot, and sweep it off the top of the heather. I caught over twenty in two forenoons in this manner. At night, by the ditch, in front of the wood, *Larentia pectinataria*, *cæsiata*, *Melanithia ocellata*, *Cidaria immanata*, *Melanippe subtristata*, *Coremia propugnata*, *Scodiona belgiaria*, *Eubolia palumbaria*, *Anaitis plagiata*, *Xylophasia rurea*, *X. polyodon*, *Euplexia lucipara*, *Rusina tenebrosa*, *Agrotis porphyrea*, *Noctua plecta*, *Aplecta nebulosa*, *Plusia v-aureum*, and *Phytometra ænea* may be taken.

The scenery at the west loch is tamer and less hilly than at the east, and the hills here are covered with woods, composed principally of oak, hazel, and elder. Flying by the side of the wood I took one of *Thecla rubi* and *Argynnis selene*. *Satyrus janira*, *Chortobius pamphilus*, *Lycæna alexis* were common, the two latter in some places simply swarmed. In the wood *Cabera pusaria*, *Tanagra charophyllata*, *Lomaspilis marginata*, *Iodis lactearia*, and many others before mentioned may be had. When I visited this locality at night I took the following species:—*Metrocampa margaritata*, *Boarmia rhomboidaria*, *Rumia cratægata*, *Emmelesia affinitata*, *E. albulata*, *Thyatira batis*, *Leucania impura*, *Miana arcuosa*, *Ephyra punctaria*, *Melanippe tris-*

tata, *Phibalapteryx lignata*, *Cidaria russata*, *C. pyraliata*, and a great many micros. The weather throughout was very dull, hardly a day passing without a shower or two.

Pollokshields, Glasgow.

NOTES AND OBSERVATIONS.

PLUSIA ORICHALCEA BRED.—About a week ago I had the pleasure of breeding two beautiful specimens of *Plusia orichalcea* from Cambridgeshire Fen larvæ. A third specimen was, unfortunately, too crippled to be of any use.—G. T. PORRITT, Huddersfield, August 17th, 1886.

REARING GROSSULARIATA AND LUBRICEPEDA.—From my 4,000 larvæ of *Grossulariata*, I have set about 80 good varieties, several very good, and drawn conclusions that I think will prove valuable. I have to-night picked a lot of *Lubricepeda* larvæ, fed upon *Aconitum napellus* (Monk's Hood), at large in my garden. The larva are almost black! I have before gathered many larva in the garden *full fed* (at large) on Belladonna, they were not dark and produced almost colourless imago!—C. S. GREGSON, Liverpool.

VARIETY OF ZYGÆNA FILIPENDULÆ.—On the chance of getting a yellow variety (*cerinus*), I collected about 300 pupæ of this insect this summer. I was not successful in my quest, but I obtained another form that is even rarer than the yellow one. The usual spots and the hind-wings are a dull dark pink, unlike any I have seen before. A pink one is figured in Mosley's Illustrations, but it is much paler in hue than mine. This was the only variety worth naming; perhaps half-a-dozen had the outer pair of spots confluent, all the rest were quite normal, and were set at liberty.—J. E. ROBSON, Hartlepool.

A. PRUNARIA TWO YEARS IN THE LARVA STATE.—A curious and I think rather unusual occurrence has lately come under my notice. In the autumn of 1885 I had a brood of *A. prunaria*, which, with one exception, had all turned to pupæ in the early part of June. Upon clearing out the cages I found a solitary larva, about half-grown, which I placed under a shade upon some fresh food, feeling rather interested to observe how much later it would emerge than the remainder of the brood. To my surprise it settled down on a twig, and has not moved since, and I have no doubt it will go through another winter and emerge next spring. I have also part of a brood of *Zonaria* in pupæ, lying over for another year, though quite healthy.—ERNEST ANDERSON, London.

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THE HERRING.

By J. OSBORNE.

IN the last volume of the *Young Naturalist* (Vol. VI. p. 65), I gave an account of the Herring and the Herring Fishery. Since that appeared, I have had an opportunity of perusing a volume of essays printed in connection with the International Fisheries Exhibition, held at Edinburgh during April, 1882. In this volume several of the essays have references to the subject of my paper, and as one of the statements made by me does not appear to be in harmony with the facts, I have thought it well to return to the subject, and endeavour to correct my error. On page 66 I said "The 'sprat' or 'herring-sprat' was believed to be a different fish from the herring," and the remainder of the paragraph was written on the assumption that this was not so, but that they were the same species. Mr. George Sim, in his essay, "The Natural History of the Herring," begins by examining the relationship between the two fish. He says—

"The idea that the sprat, *Clupea sprattus*, was the young of the herring, *Clupea harengus*, was held by Willoughby, who was supported by Fleming, and others who followed him; and amongst the first who controverted this view was Block, and Rutton in his "Natural History of Dublin. From this time downwards, opinion seems to have been divided on the subject; latterly, however, it would appear as if the idea of the sprat being the young of the herring had been given up as untenable; for most authors on Ichthyology, whose works appeared through the early portion of the present century, set the sprat down as a distinct species. Of late, however, the question has again been opened, and some strong opinions have been expressed to prove their being one and the same, and several furious paper wars have been fought over it.

"Amongst such writers may be mentioned James G. Bertram, who, in his "Harvest of the Sea" (1865), page 239, says 'It is generally known that the sprat (*Clupea sprattus*) is a most abundant fish, so plentiful as to have been used at times for manure. The fact of its great abundance has induced a belief that it is not a distinct species of fish, but is, in reality, the young of the herring. It is true that many distinguishing marks are pointed out as belonging to the sprat—such as the serrated belly, the relative position of the fins, &c. But there remains, on the other side, the very striking fact of the sprat being rarely found with either milt or roe....After the nonsense which

was at one time written about the parr, and considering the anomalies of salmon growth, it would be unsafe to dogmatise on the sprat question. As to the serrated belly, we might look upon it as we do the tucks of a child's frock, viz., as a provision for growth. . . . The slaughter of sprats which is annually carried on in our seas is, I suspect, as decidedly a killing of the goose for the sake of the golden eggs, as the grilse slaughter, which is annually carried on in our salmon rivers.' As to this writer's statement that the serrations on the belly of the sprat may be regarded in the same light as the 'tucks in a child's frock, viz., a provision for growth,' and that milt and roe have seldom been found in that species, as also other writers such as Parnell, in the *Magazine of Zoology and Botany*, for 1837, who says that the 'serrations on the belly are to be found in all young herrings, and as they advance in size these serrations get worn off or disappear, through the belly of the fish expanding in breadth, and when the fish come to have milt and roe, these serrations get quite obliterated.' All these statements can, I think, be clearly shown to be quite fallacious, and do not in any way agree with the facts of the case. First, because I am satisfied, from the examination of a large number of both species, at all stages of growth, that the herring has *no serrations on the belly at any stage of its existence*, while on the other hand, the larger the sprat becomes the more distinct do these serrations appear. Second, as has been pointed out by other writers, the fins of the two species are differently placed; and this, of course, holds good at every stage of their existence. In the herring, the dorsal fin is about a third of its own length in front of the ventral fins, while, in the sprat, the same organ is usually about a fourth of its length *behind* the ventrals. Third, the head of the herring is longer than that of the sprat, measuring individuals of the same length of body. Fourth, the colour of the two fish is different. Fifth, sprats are thicker, what we might call broader shouldered, than herrings of the same length. Sixth, a most important point is that the anatomy of the two fish is different, in so far as the herring has from fifty-five to fifty-eight vertebræ, never less than fifty-five, what the sprat has but forty-seven to forty-eight. This difference has been pointed out by previous writers. An additional point in their being distinct species is, in the herring having well developed articular processes on a number of the vertebræ. These processes arise from the base of the transverse processes of each vertebra, pointing towards the head of the fish, and are of a long needle-like form, whilst, in the sprat, the same organs are merely represented by short obtuse knobs. I am not aware of this difference in the two fish ever having been noticed before, and, as will be seen, it is evidence of considerable value in proof of the two fish being distinct: evidence also that the observation of previous writers has been rather loose.

"In addition to what has been already advanced, it may be stated that many sprats caught about the month of December will be found with milt and roe far advanced towards maturity, some of which I possess, while herrings of the same size, and considerably larger, have nothing such; that is in sprats of $5\frac{1}{2}$ inches long, which is about their average length, the milt and roe are almost fully developed, while herrings of from 6 to 7 inches long have these organs in the lowest possible stage."

I have quoted this extract at length rather than put it into words of my own. It seems perfectly conclusive that the sprat and the herring are two different fish. I make no pretence of being an Ichthyologist, but only one who tries to go through the world with his eyes open, and to pick up a trifle of information on whatever subject I feel interested. My error was in taking for granted what was said by these authors, whose writings I had had the

opportunity of examining. Professor Huxley, in an article on "The Herring," in *Nature*, for April 28th, 1881, does not seem to have been much more correct than I was, with all his opportunities. I can from personal observation confirm Mr. Sim, when he disputes Professor Huxley's statement as to young herring attaining the length of three inches in ten weeks. Like Mr. Sim I have seen young herring cast ashore in January and February that were but $1\frac{3}{4}$ to $2\frac{1}{2}$ inches in length, and which must of necessity have been from spawn deposited in the previous August. This harmonizes with the results obtained by Dr. Meyer, who kept the fry under observation for five months. At the end of three months they were $1\frac{3}{4}$ inches long, at the end of five they were $2\frac{1}{2}$ to $2\frac{1}{2}$ inches. No doubt fish grow with marvellous rapidity under certain favourable conditions, but if Professor Huxley be right, the fish washed ashore in the beginning of the year ought to be at least five inches long. He also says in the same article, "It does not appear, however, that there is any good evidence against the supposition that the herring reaches its spawning condition in one year." And also, "Full herrings may be met with little more than seven inches long." But it seems more than doubtful if herrings spawn within the first year, and if they were three inches long in ten weeks surely they would attain their full size in one year. But it is clear that herrings vary in size according to locality. Mr. Buckland, in his "History of the Herring," says the largest he had seen were from Shetland, they were $9\frac{1}{4}$ inches long and weighed $9\frac{1}{4}$ ounces: "The roe and milt were slightly developed; they were very fat." Mr. Sim says the largest he has seen was a female taken on 4th August, 1880. It was $12\frac{1}{4}$ inches long and weighed $9\frac{3}{4}$ ounces. It was "full." Though so much longer than Mr. Buckland's fish, and full of roe, it was only half-an-ounce heavier, the Shetland fish, therefore, must have been a much thicker fish. With the exception of the skate and its allies, the eggs of all fishes I know are extremely small, and the growth that may appear slow, is not so in reality when we consider how very minute they must be when first hatched. The cod is believed to spawn when five or six years old, the haddock when four or five, and though nothing is known with certainty it seems unreasonable to suppose that the herring does so within a year of the depositing of the spawn from which it sprung. It is quite possible, and even probable, that some fish will mature before others and spawn earlier. Perhaps the smaller fish found "full" have thus developed their spawn a year before the larger ones.

The food of the herring has been a disputed question, but this may now be considered settled. They live on the smaller crustaceous that abound in all seas at all times. It is a curious fact that as the spawn approaches its full development, the fish, which had been a voracious feeder, ceases, or nearly

ceases, to eat. The millions that congregate together for spawning would, doubtless, have some difficulty in obtaining food in sufficient quantity, if they required as much as before, but they evidently eat little or nothing at this period. When in this fasting state the fish cures better than when gorged with food. Those taken at the beginning of the season will not, when cured, keep more than a week or two, and when the herrings find their way, gorged with food into the narrow Norwegian fiords, the fishermen there interpose a barrier of nets between them and the sea, thus compelling them to fast a few days before taking them, so that they may be in better condition for curing.

In my former paper, I referred to herring abandoning localities that had been over fished. From a leading article in the *Standard*, of the 14th August last, I quote the following, "In brief, the jeremiads which used to fill the Blue books, regarding the decay of the Herring fishing, have been proved baseless. The depleted localities have turned out as rich as ever, and the moderately good ones better than before." It is quite true that the herring has returned to some of these depleted localities, but the conclusions of the *Standard* implies that the statements as to the fish having abandoned them were baseless. It is not so. From many well known fishing grounds, the herring has disappeared for years, and that it is returning to some of them again is easily accounted for. When a locality is over-fished, it is perhaps scarcely stating the case correctly to say that the fish abandon it. In nature the balance of life is only kept up when not interfered with. Fish are so prolific that were they allowed to increase without check, one can scarcely conceive what would happen, but in the case of the herring "the active company of whales, dolphins, porpoises, dog-fish, cod, gannets, cormorants, gulls, and their thousand other enemies," are the means provided by nature for preventing their too great increase. When, in addition to these natural checks, man captures the fish in thousands of millions it is no wonder that their numbers are greatly diminished. It is not until they have become so scarce, that the fishery ceases to pay, that much notice is taken of their decrease. Year after year only few are caught, but this few is perhaps as large in proportion to the total number, as were the former hauls. At last, tired of his unproductive fishing, it is announced that the fish have deserted the locality, and the fishing ceases. Their natural enemies are as destructive as ever, and having better methods than man, they obtain herring when man cannot. But after a time the fish begin to increase, and ere long they are again so numerous as to make fishing "pay," and newspaper writers imagine its supposed disappearance was a mistake. The Norwegian method of fishing has been already alluded to. The fish found their way into the narrow fiords, nets were then stretched across the entrance, and all that had entered were captured. But

it was quite easy for the shoal to miss the mouth of the fiord altogether, and then, as in the case of some of the Scotch lochs and friths, it might be said the fish had deserted them. Deep sea fishing is always more or less successful, shore fishing when successful is generally very successful, and that is accounted for by supposing that "the vanguard of the shoal finds itself confronted by the land and pulls up, while the main body are still pushing forward.....instances are on record of great quantities of the fish being cast ashore in this country, and more particularly in Norway, by the receding tide."

NOTES ON LEPIDOPTERA.

By B. LOCKYER.

(Continued from Page 190.)

ELLOPIA FASCIARIA.—Larvæ on young fir trees, in New Forest. March and April.

EURYMENE DOLOBRARIA.—May and June. Much commoner as a larva than as an imago; comes to sugar. There was a large holly bush in Ramnor Inclosure, New Forest, noted as the resort of this species. It requires a quick eye and hand to effect its capture, as it has a habit of darting out *a l' instant*, perhaps after some moment's efforts to dislodge it have all but exhausted one's patience. It is remarkable that specimens bred from larvæ are scarcely, if ever, equal in size or depth of colour to captured ones, and but a small proportion emerge at all. New Forest, Bishops Wood, Hampstead, and West Wickham.

PERICALLIA SYRINGARIA.—Used to occur sparingly in Bishops Wood, Hampstead, also at Lyndhurst. Rather a high and rapid flier. July.

ENNOMOS EROSARIA.—Taken sparingly at sugar, and as a larva in the New Forest. Larva, July and August; imago, August and September.

E. ANGULARIA.—At light and on palings. Hampstead and Lyndhurst. August and September.

E. TILIARIA.—At light and as a larva. Hampstead and Lyndhurst. Rare.

PHIGALIA PILOSARIA.—Common as a larva in all the woods near North London and in the New Forest. May and June. Never saw an imago, and 99 out of 100 of the larvæ dry up underground, or otherwise perish.

AMPHIDASYS PRODROMARIA.—At rest on oak in the New Forest (according to George Tate, who never found it abundantly, though the larvæ are usually common.)

HEMEROPHILA ABRUPTARIA.—The favourite resting place of this species is the stone or brickwork of garden walls, generally as much in the shade as possible; also found on palings and comes to light. Middlesex, Surrey, and Hants. Do not feed your larvæ on lilac, it covers them with a peculiar gummy exudation, which you will find will destroy the greater part of the brood. This species becomes smaller and more richly marked when reared in captivity. The newly-hatched larva is rather a pretty object.

CLEORA GLABRARIA.—At rest on boles of beech, at some height from the ground. July and August. Near Pondhead, New Forest, &c.

BOARMIA REPANDATA.—A wild insect on the wing and a rather lofty flyer. Comes freely to sugar in the New Forest, but never saw it so taken near London. Common at Hampstead, Highgate, and Lyndhurst, in June and July. Woods only.

B. RHOMBOIDARIA.—July and August. Most abundant in gardens, where it may be found at rest on walls or palings by day. Comes to light freely in the evening, both sexes are attracted; the male is much too fond of self-immolation. The larva feeds on all sorts of garden produce. I have taken it freely as early as February, when it may be found by night hanging quite rigid from its food-plant. All the larvæ I have seen, which are full-fed in May and beginning of June, are of a dingy gray, with a few dull ochreous variegations, and a little conical point on the sides of the 6th segment, in the region of the skinfold, which distinguishes it at a glance from *B. repandata*. Of course the imago is to be captured freely by mothing. Middlesex and Hampshire; also in woods.

B. ROBORARIA.—June, July, and August (3rd latest). At sugar and at rest by day, usually but not always at a considerable elevation, on the trunks of oak. Lyndhurst.

B. CONSORTARIA.—End of May and June; also at rest on oak. Lyndhurst.

TEPHROSIA CONSONARIA.—I have invariably taken this species at rest on trunks of fir, about 10 feet from the ground, where it forms a conspicuous and pretty object. It is strong on the wing, and does not seek the open parts of the woods for exercising its powers of flight. About the middle to the end of May eggs may be procured with ease in a chip box, they are very small, pale yellow, and deposited in large batches. The larvæ are very lively in captivity, but not difficult to rear. Woods in the New Forest (plantations only.)

T. EXTERSARIA.—Comes to sugar in June and beginning of July. Woods in the New Forest.

T. PUNCTULATA.—April and May. At rest on trunks of various trees in woodland paths.

PSEUDOTERPNA CYTISARIA.—July and August. May be easily stalked up by day. On heaths in New Forest.

GEOMETRA PAPILIONARIA.—This pretty insect comes to light in July and August. The larva, which like that of *U. sambucata*, must not be kept under leno after the last moult, is very lethargic and a sparse feeder, seeking a resting place at the extreme tips of the catkin-bearing twigs of its food-plant (*Betula alba*), generally at some height from the ground, during the day-time; and as it sits attached, by its claspers only, with arched back and head tucked under, seen against the sky it resembles closely one of the catkins, the deception being aided by the coloration. On no account attempt to remove the larva with the fingers or to beat it, as it sticks like grim death, and its powerful claspers would be maimed sooner than relax their grasp. May and June. The pupa is large, plump, and pale emerald green, tinted in parts with ochreous, and enclosed in a web among leaves, or in muslin if that is at hand. Bishop's Wood, Hampstead, Highgate Wood, and New Forest. Never found it common; once took six larvæ in one afternoon.

NEMORIA VIRIDATA.—Rare. By beating sloe or hawthorn. May. Lower part of Park Hill inclosure, New Forest.

PHORODESMA BAJULARIA.—By mothing round oak trees and bushes. Usually flies high. End of June and July. Woods at Highgate and Hampstead, and Lyndhurst.

HEMITHEA THYMIARIA.—June and July. By beating and mothing. Woods and lanes near London, and the New Forest common.

EPHYRA PUNCTARIA.—May, June, and August. Easily dislodged from undergrowth and the lower boughs of oak by day, as well as captured by mothing. Woods round London and in the New Forest, especially Stubby Copse.

E. TRILINEARIA.—Common, at rest on trunks of beech (*Fagus sylvatica*) not at any great elevation. May. The larva is abundant in August on the same tree, and is almost a counterpart of that of *E. punctaria*, but the green variety has the oblique marks of a saturnine red (or exactly the colour of an apricot), and the other variety is a much deeper tint, or browner than that of *E. punctaria*.

HYRIA AURORARIA.—Flying swiftly by day, skimming the tops of long grass in the lower part of Park Hill inclosure, New Forest. July.

ASTHENA CANDIDATA.—By mothing and beating bushes in woods. May

and June. Very common in Middlesex, at Hampstead and Highgate; not rare in Knole Park, Sevenoaks, and West Wickham.

ACIDALIA SCUTULATA and *BISETATA*.—At rest on palings, and flying along weedy banks, June or beginning of July. Highgate not very common.

A. TRIGEMINATA.—July and August. At sugar, in woods, or by mothing. New Forest.

A. INTERJECTARIA.—Same habits as *A. bisetata*, only in fine condition at end of June and beginning of July. Highgate.

A. INCANATA.—Ditto. By beating and mothing in woods.

A. IMMUTATA.—By beating bramble, &c., by day. July and August. Park Hill and Stubby Copse, New Forest.

A. REMUTATA.—By mothing and beating in woods. June and July. Highgate, Hampstead, and West Wickham.

A. AVERSATA.—By beating, mothing at sugar, and at rest on palings usually not far from the ground. June, July, and August. Woods and lanes, near weedy places. Common round London and in the New Forest.

CORYCIA TEMERATA.—Used to take this at the end of May and in June, by beating bird cherry by day, and by mothing. Not common. Bishop's Wood, Hampstead; near Addington, in a plantation called "Ballards" or "Germans," and said to be common in parts of the New Forest.

C. TAMINATA.—May and June. By beating and mothing about sloe, &c., and rest on fir trunks. Rather common in woods; "Ballards," Addington (Surrey), and New Forest.

MACARIA LITURATA.—By beating old fir trees. Ramnor inclosure, New Forest. July.

HALIA WAVARIA.—June and July. At rest on garden walls and at light. London.

PANAGRA PETRARIA.—By beating and mothing about Bracken in woods. Bishop's Wood, Hampstead, West Wickham, and New Forest. May and June.

SCODIONIA BELGIARIA.—To be taken till late at night, resting with closed wing on flowers of heather. May. Shirley Heath, Surrey; also said to occur at Lyndhurst.

SELIDOSEMA PLUMARIA.—Abundant in July, on heaths near Lyndhurst, New Forest. Female at the beginning of August. Disturbed by day.

(To be continued.)

NOCTURNAL ENTOMOLOGY.

BY ERNEST ANDERSON.

Most lepidopterists have experienced, in the course of their researches, occasions when they have been compelled to cease operations at the most interesting and productive time, in consequence of having to catch the last train home, in many instances having a mile or two to walk to the station, causing a still further waste of time, as, generally speaking, very few observations can be made on the road.

There are only two alternatives to the above, namely, to stay late and then walk home, or to stay on the ground throughout the night, returning by the first train in the morning. Certainly, in some cases, a bed may be secured somewhere near, but even then objections are raised against the collector staying out late. I am more particularly referring to cases when some particular night turns out unusually productive, which generally happens when least expected or prepared for.

Experience teaches us that such occasions must be at once taken advantage of, in fact it is another instance of "Make your hay while the sun shines," for one may find a species in abundance one day, and hunt in vain for it the next. The idea of staying out all night is, however, by the majority of collectors, considered to be out of the question, a variety of fears and fancies of chills, ague, exhaustion, &c., presenting themselves to their imagination. As a matter of fact, however, a night in the woods, especially during the summer or early autumn, is fraught with little risk of the above kind, and the naturalist is well repaid for his hardihood, by having as it were the gates of another world opened to him.

My first experience of a night's collecting was in July, 1881, and it was brought about in the following way. A very animated discussion had taken place among some entomologists (myself being of the number) respecting the habits of the crepuscular geometers, several affirming that in all probability the evening flight was renewed just before daybreak. The species with which the argument was chiefly connected was *Angerona prunaria*, and finally a party of us determined to stay out all night in order to investigate its habits and settle the matter. We found that this species confines its flight from twilight to about half-past ten o'clock, and no signs of it were to be found either just before, or at daybreak, though we were in the same glades where it had been plentiful the evening before. The only geometers that occurred at daybreak were *Metrocampa margaritata* and *Asthena candidata*, and these were less numerous than they were during the previous evening. We found the night pass very quickly, and we suffered no inconvenience from cold,

until the early morning when it was rather sharp. So pleased was I with my experience on this occasion, that I repeated the experiment the following week—this time alone—and I think I never spent a more enjoyable night. Lepidoptera were in great profusion, and I had the pleasure of finding an “assemblage” of *Pericallia syringaria*. It was extremely interesting to watch the succession of males which came up the glade, and hovered round the bush in which the female was situated. It was then about 1 a.m., and, of course, the insects could only be seen against the sky, unless with the aid of a lantern. I had to leave them in order to examine my sugar, which was only sparingly visited during the night, but was extensively patronised about day-break. Three species, viz., *Batis*, *Derasa*, and *Hepatica* continued their visits after day-break. This was at Chingford, and about 4 a.m. I started to walk home, arriving in ample time for breakfast, and feeling not any the worse for my night out.

Since then I have regularly spent nights in Epping Forest, sometime alone, at others accompanying the organised Natural History expeditions (frequently extending over two or three days), arranged by the members of the Association to which I belong. By this method we were enabled to push further into the interior of the Forest, and make observations on many species, which, before I tried night collecting, were complete mysteries to me.

My object in writing these notes is to bring my experience before brother entomologists, and should any take my advice, and try the experiment themselves next year, they will find that I have in no way exaggerated the good results that may be obtained during a night in the woods.—*Reprinted from “Natural History Research: a Monthly Record of Natural Science,” issued for private circulation only.*

THE ORIGIN OF APTEROUS FEMALES.

By C. B. CROSS.

This particular group of moths has been my favourite study for some years past, and I have lost no opportunity of observing the habits of those occurring in this locality, viz., *H. defoliaria*, *C. brumata*, *H. progemmaria*, and *P. pilosaria*. The first two appear on the approach of winter, the latter two on the approach of spring. My opinion is that the females are now as originally formed, and that nothing has resulted from any malformation. *Brumata* and *progemmaria* have rudimentary wings; *defoliaria* and *pilosaria* have not even a stump, nor the slightest evidence there has ever been one. I have never seen the first two make the slightest attempt to use the little wings they have.

Whatever deficiency the females have in this respect is more than made up by the ample wings of the males. For example, *C. brumata* has so small a body that its large wings seem out of all proportion, and more than is needed for flight, but when it is known that it carries its partner from tree to tree when disturbed, and perhaps without being disturbed, the advantage of the large wings becomes apparent, and he is able to carry her with a quick and steady flight. I have seen all four species in copulâ, and the male is very much more wary and shy then, than when alone. As you approach to box or net them they fly off before you are within ten yards of them, and fly up and up till quite out of reach. At other times you can box a single male off a tree trunk as easily as you may box a noctua off sugar. I believe the reason the females have no wings is because they occur at a season of the year when high winds prevail, and all sorts of bad weather, and if they flew much they might be blown from shelter and destroyed. As to malformation, I have had apterous males, as well as females, of many different species, both from larvæ reared in confinement, and from pupa collected out of doors.

Shaftesbury Street, Glasgow.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

September 1, 1886.—ROBERT M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows:—The Rev. Professor Dickson, D.D., of Glasgow University; Mr. P. Cowell, of Liverpool; Mr. A. O. Walker, of Colwyn Bay, North Wales; and Mr. Lyddon Surrage, of Hertford College, Oxford.

The President remarked with regard to the gnats from the Kent Waterworks, exhibited at the last meeting, that Professor Westwood had since informed Mr. Douglas that they were only *Culex pipiens*.

Mr. Slater exhibited certain parasites found on the body of a larva of *Smerinthus tilia*, which Mr. Waterhouse believed to be *Uropoda vegetans*, a species of *Acari*.

Mr. W. Warren exhibited the following Lepidoptera, viz.:—*Eupithecia fraxinata*, caught in Regent's Park; *E. innotata* (Hüb.), bred from *Artemisia maritima*; a variety of *Eupithecia satyrata*; a *Gelechia*, caught in Wicken Fen twenty years ago by Mr. Bond, and believed to be a new species; *G. fumatella* (Dgl.) or *celerella* (Stn.) from Hayling Island; *G. vilella* (Zell.), bred from larvæ collected on the Essex coast on mallow; *Lithocolletis scabi-*

osella (Dgl.), bred from larvæ found near Croydon; and *Caloptria parvulana* (Wlk.), bred by Mr. Vine, of Brighton, from *Serratula tinctoria*. He also exhibited larvæ of *Gelechia vilella*.

Mr. South exhibited specimens of *Dicrorampha distinctana* (Hein.), and stated that he considered it to be merely a variety or local form of *D. consortana*, from which, in the larval stage, it could not be separated.

Mr. Stevens exhibited a living specimen of *Clerus formicarius*, recently found under the bark of an ash tree in Arundel Park, Sussex.

Mr. Billups exhibited *Chrysis succincta* (Linn.), obtained by sweeping at Chobham, on 28th July last. He stated that this very rare species was recorded by Shuckard as having been taken in a sandy lane near Brockenhurst, in the New Forest, and at Blackwater, on the borders of Berks and Hants; and he further stated that the late Mr. Frederick Smith had also taken two specimens of this species in Hampshire. Mr. Billups also exhibited *Microphysa elegantula* (Baer), found at Broadstairs, Kent, on 23rd August last.

The Rev. W. W. Fowler exhibited, on behalf of Mr. Theodore Wood, a larva of *Langelandia anopthalma* (Aubé), a species new to Britain.

Mr. H. Goss exhibited specimens of *Oxygastra Curtisi* (Dale), recently taken near Christchurch, Hants. He stated that he had met with the species in the same locality in 1878, but had never seen it anywhere else in the United Kingdom, nor was he aware of any recent record of its capture. Mr. M'Lachlan observed that the species was taken many years ago in Dorsetshire by the late Mr. Dale, but that he knew of no recent captures except those recorded by Mr. Goss. He also made some remarks as to the distribution of the species on the continent of Europe.

Mr. M'Lachlan exhibited a specimen of *Dilar meridionalis* (Hagen), taken by him in July last in the Pyrénées Orientales; also about 150 examples of the genus *Chrysopa* from the same district, where these insects abounded. Amongst them were *C. vulgaris* (Schneider), *perla* (L.), *Walkeri* (Brauer), *viridana* (Schneider), *tenella* (Schneider), *prasina* (Burm.) and varieties, *flava* (Scop.), *septempunctata* (Wesm.), *flavifrons* (Brauer), and others not yet fully identified. Mr. M'Lachlan stated that he had obtained about 1500 specimens of Neuroptera in all families during his recent visit to the Pyrenees, which were being prepared for study. He also exhibited a few Coleoptera from the same district, and remarked on the extraordinary abundance of the pretty Lamellicorn, *Hoplia cærulea*, which was so common as to give the meadows the appearance of being studded with multitudes of brilliant blue flowers.

Mr. C. O. Waterhouse called attention to the numerous reports, which had lately appeared in the newspapers, of the supposed occurrence of the

Hessian Fly (*Cecidomyia destructor*) in Britain, and inquired whether any communication on the subject had reached the Society.

The Rev. W. W. Fowler stated, in reply, that he had been in communication with Miss Ormerod on the subject, and that she had informed him that neither the imago nor larva of the species had been seen, and that the identity of the species rested on the supposed discovery of the pupa.

Mr. A. H. Swinton communicated a paper, entitled "The dances of the Golden Swift." In this paper the author expressed an opinion that the peculiar oscillating flight of the male of this and allied species had the effect of distributing certain odours for the purpose of attracting the females.—
H. Goss, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting of this Society, held August 19th (the report of which should have appeared in the previous number), was rather poorly attended. Among the exhibits, however, may be mentioned a series of *E. autumnaria*, bred from ovæ, by Mr. Hockett. Some bred *Thecla betulæ*, from larvæ taken in Epping Forest, by Mr. Pearson; also some very large *Vanessa io*, by Mr. Harper. Mr. Pearson mentioned having captured a specimen of *Colias edusa* in Surrey, on the 15th.

At the following meeting there was a much better attendance, and several interesting accounts of members' work were mentioned. The general account of those who have worked up the Lea valley this season appears to prove an unusually large quantity of the larvæ of *C. elepenor*; but those of *S. ocellatus*, which were in great profusion last autumn, seem very nearly absent this year; and the larvæ of *Arctia urticae* also seem very scarce. Dr. Sequeira exhibited a large store box, containing the result of three week's work in the Isle of Wight. A very large number of species were represented, among which may be mentioned *E. omniconaria*, *C. lichenaria*, *C. miniata*, *B. glandifera*, *L. complana*, *M. sociella*, *B. asinalis*, &c. Mr. Clark showed fine examples of those species he had bred this year, including *B. rhomboidaria* var. *perfumaria*, *N. cucullina*, *S. chrysidiformis*, *D. irregularis*, &c. Mr. Gurney mentioned having visited Epping Forest the previous evening, and taking *A. pyramidea* in very fine condition; he exhibited living specimens, and also a specimen of *G. libatrix*, captured on the same occasion. Mr. Pearson showed the sexes of *S. semele*, and the *C. edusa* which he captured on the 15th, the specimen was very small.

On September 2nd, Mr. Clark showed a long series of *N. mundana*, which he found commonly in one spot near Windermere, he also exhibited some ova, supposed to be those of *P. bucephala*, from each of which a small fly

had emerged, he considered it an interesting proof of lepidopterous ova being attacked by parasites. Mr. Anderson exhibited some *H. sylvanus*, a very small dark specimen of *T. janthina*, and one *M. albicolon*, from the Warren, Folkestone; and mentioned that *A. galathea*, *P. phlœas*, *L. agestis*, *S. megæra*, and other common species of Diurni were all represented there.

The President, at the meeting on September 9th, exhibited some very fine *P. phlœas*, and remarked that the species had appeared commonly all round London this year, a fact worthy of record as its scarcity of late years had been frequently commented on. The Secretary mentioned having received from the Kentish hop gardens a number of larvæ of *A. betularia*, which were without exception of a green colour resembling the hops; he had obtained the same species from cherry trees and they were then of a dark brown, while from oak and beech they were beaten of an ashy colour resembling the twigs; he drew the attention of the members to this varying mimicry in larvæ as a fact worthy of further investigation.

Mr. Pearson then brought forward the life-history of *Satyrus hyperanthus*, and drew attention to the habits of the larvæ, which were of an ashy-grey colour, feeding at night upon various species of grasses, at the edges of woods and on grassy downs; the ova being laid in July, the larvæ hibernating and being full-fed about May. After several gentlemen had spoken regarding this species, Mr. Harper mentioned that he had at times worked this species for the variety *Areta* (see Y. N. list); and about four years ago he met with several of this form at Raindean Wood, near Folkestone, and also near Dover, where he took one specimen having the "ringlets" very much intensified, he had never seen any variation of the upper side. The species commenced flying very early, and at first sluggishly, but later in the day it had a swift flight. Bramble blossoms were favourite settling places for it, and it was never found very far from bushes.

On the 16th September records of *H. protea*, *C. diluta*, *T. orbona*, &c., at Epping Forest were handed in, but accounts of the autumn larvæ there, are not very encouraging at present—a fact the more remarkable as the gardens in most places round London are regularly eaten up by such common species as *M. brassicæ*, *M. persicariæ*, *H. oleraceæ*, *M. fluctuata*, and the two common species of *Arctia*, with a sprinkling of *H. chenopodii* and *E. lucipara*.—
ERNEST ANDERSON, Secretary.

CLYDESDALE NATURALISTS' SOCIETY.

The first meeting of the fourth session was held on Wednesday evening, 8th September, in the Society's rooms, 207, Bath Street, Glasgow. Mr. T. J. Henderson, president, in the chair. Mr. William Speirs, Anderston, Glas-

gow, was elected an ordinary member, and four new members were proposed. Nominations were handed in for the several offices which had become vacant, and these will be balloted for at next meeting. Mr. John M. Campbell exhibited living specimens of the smooth snake, *Coronella laevis* (Lacép), from Hampshire; and specimens of the midwife toad, *Alytes obstetricans* (Laur.), with eggs, from France, regarding which a paper was read describing their habits and distribution. Members were then invited to hand round for inspection any specimens they had with them for exhibition, and several boxes containing lepidoptera were shown. Mr. Henderson's box contained some very pretty varieties of common species, including *M. montanata*, *C. bilineata*, *A. aversata*, and also specimens of *H. glauca*, *H. binævella*, *P. acanthodactylus*, &c., taken in the district. Mr. C. B. Cross showed a beautiful preserved larva of *S. carpini*, mounted by Mr. Pierce, of Liverpool, which was much admired, as it was thought impossible to preserve the larva without destroying its beautiful greenish tint. Mr. Cross also showed a fine series of *E. similella*, a species never before recorded for the West of Scotland. Mr. J. Mackay exhibited a box containing some Argyllshire lepidoptera, including *G. papilionaria*, *C. davus*, *C. duplaris*, and also some interesting varieties, among others, a nice banded specimen of *rhomboidaria*, *H. hectus*, in which the gold spots of the upper wings were also to be found in the lower, and a female specimen with the same markings as the male. His box also contained a specimen of *M. montanata*, in which the band was entirely absent, the only markings being a little spot on each of the upper wings; and some rare species such as *M. athalia* and *cinxia*, *A. alni*, *strigosa*, *E. versicolora*, &c. Mr. E. Wilson exhibited larvæ of *P. bucephala*, and Mr. Alex. Stewart showed a fully developed egg which had been found with others inside the dead body of a turtle.—JOHN MACKAY, Hon. Sec.

EXCURSION TO PAISLEY.—On Saturday afternoon, 4th September, the members of this Society visited Paisley, and spent a most enjoyable afternoon collecting on a part of the famous Gleniffer Braes. Mr. Alex. Stewart acted as leader, and discharged his duties to the satisfaction of all present. The afternoon was a delightful one, but, notwithstanding, very few specimens were taken. A few *V. urticae* were seen flitting about, and these, with a few "whites," were the only representatives of Diurni seen during the day. Specimens of *C. Haworthii*, *C. graminis*, *C. fulvata*, *H. micacea*, and a few other species were taken. Refreshments were partaken of in the "Peesweep Inn," where a most enjoyable half-hour was spent over the fizzing "Lemon," and new baked scones and cheese—if nothing stronger! On the way back to Paisley, the members of the party who collected micros had good success,

and a number of fine species were reported. It was quite dark when we reached the "Lang Toon o' Paisley," and here we were entertained to a refreshing tea by our worthy leader, which detained us to rather a late hour. Glasgow was reached at 10 p.m., every one thoroughly delighted with his afternoon's outing on the celebrated "Braes."—JOHN MACKAY, Hon. Sec.

TO YOUNG NATURALISTS.

By THE EDITOR.

Since the cessation of the weekly issue of the *Young Naturalist*, the gossiping articles that generally occupied the first page have been discontinued. It is far from certain that this has been for the advantage of that class of readers for whom the *Young Naturalist* was mainly intended. Beginners in any study have a great deal to learn, and a great many little details to find out, that can no doubt be best gathered from the experience of those who have been at the work for sometime. The familiarity assumed then gave opportunity for dropping hints and suggestions, that have been of great service to many just beginning to collect. In the more formal articles that have since appeared this advantage has been lost. Believing that whenever one asked a question there were always a larger number to whom the reply would be both interesting and advantageous, at that time, instead of replying to questions by post, articles containing the information sought were written whenever such information was likely to be useful to others. Since then queries of that kind have been answered by letter, and as it entailed a considerable amount of correspondence, the replies were often cut shorter than they ought to have been, particularly when the same question was asked two or three times in close succession, or when other matters were more pressing. Again the attention of beginners was then called from time to time to new points, discussions often originated over a crude hint, and there is no doubt that all this, however stale it might be to those who knew as much or more than I did, was of great advantage to many. I had a fond hope when the *Young Naturalist* was commenced, to revive the glorious days of the *Weekly Intelligencer*, but I was not a Stainton to begin with, and the novelty was worn off, and could not have been restored. Still I am pleased to think that the *Young Naturalist* has, in its way, assisted many who were just taking up the study of Natural History, and that there are some who look upon it much as I for one looked on the dear old *Intelligencer*. I have frequently been urged to give a monthly article of similar character to those referred to, and propose to do so now, and invite the cordial co-operation of all my readers.

In making this announcement I do not wish to lay down any hard and fast line that shall not be departed from. Neither to say that I will do one thing or will not do another. I will try as far as possible to give information that will be useful. Hints on collecting and breeding, on preserving and setting, on arranging etc., etc., all kind of objects in Natural History, most attention being given to those that interest the larger number of the readers of the *Young Naturalist*. Remarks on captures, notes on species and varieties, and gossip generally, upon the objects we collect or study, such as might be supposed to be conveyed to a few young friends in an "At Home."

I invite then, the readers of the *Young Naturalist*, to communicate more freely and more numerous than they have hitherto done. Whatever subject may be raised, will find a place here, if suitable. Whenever my own knowledge is not sufficient to enable me to answer enquiries, or remove difficulties, I will apply elsewhere for help, and trust by the able assistance that is so freely at the service of the readers of the *Young Naturalist*, that no information sought for will be wanting. I do not propose necessarily to confine each article to one point as was done before. A line or two will be enough on one subject, while another may demand a page. I take up the subjects now, on which I have had most communications recently, or which seem to me most interesting.

Agrotis aquilina, tritici, &c.

I have had numerous enquiries respecting these species, but I do not know that I could add much to what was said in an article on the subject in the Y.N. Vol. II. p. 157. In the six years that have elapsed since then I have examined a large number of *aquilina* and a very much larger number of *tritici*. There no doubt are many specimens that would not be easily attributed to the correct species, if examined alone, but most of the difficulties I have had, have been from specimens in bad condition, being sent to me to name. A bad specimen except of a great rarity is utterly worthless, and to set worn *tritici* and then send them out to be named is a pure waste of time. I have had some miserable little things sent me that were so worn they might pass for *aquilina* as well as anything else, were it not that they were much too small. The smallest *aquilina* is always as large as the largest *tritici*, and if you have an insect expanding over $1\frac{1}{4}$ inches, whatever else it may be, you may be confident it is not *tritici*. Hereabouts—on the North-East coast—*tritici* is generally large and well marked, generally with a golden brown shade that is very distinct. On the South-East coast the species is mostly smaller and duller, and I have never seen one with the rich golden hue of a fine fresh specimen from this part of the coast, nor are the markings so well defined. I have seen but few from the South coast, and

have often asked for it in vain. I have a pair, bred from South coast larvæ by the late Wm. Buckler, that agree perfectly with the description given in "Stainton's Manual." These and all others I have seen are *greyer* than any others. On the West coast, it varies nearly as much as here, but it does not run so large, nor of so rich a hue. A box-full from the Cheshire sand Hills, is before me as I write, all that one gentleman has taken this season, and therefore a typical lot. They are mostly small, and I think I will best convey my meaning when I say they have a *shabby* look. I have this year had the rare pleasure of examining a hundred *aquilina* all taken in one locality, the results of a regular nightly sugaring for them where they were known to occur, and as long as they were out. To show the difference in the abundance of the two species, I may say that I would have had no difficulty, in taking as many *tritici* here every night for a month. These *aquilina* run considerably larger than *tritici*, about nine out of ten being larger than the largest of that species, and the smallest being larger than three-fourths of the *tritici* from Cheshire. By the size alone, there, they may be distinguished when there is a series of both. *Aquilina* is more uniform in tone and yellower than any *tritici* I ever saw. I know colour names rarely convey the same thought to two minds and there does not seem much difference in idea between golden brown and yellow brown. But the golden brown *tritici* are of a deep rich hue, the *aquilina* are a yellowish grey brown, colder and duller and paler than the other. *Aquilina* are more of the hue of South coast *tritici* with a yellow tint instead of grey. I invite all who are in doubt to send me their series. I will not undertake to name single specimens with certainty, but when a series is sent I think I can do so. Many correspondents speak of having difficulties with *nigricans*. I have never seen any doubtful specimens of this insect and will be glad to make their acquaintance.

Strenia Clathrata.

Common insects like this are so seldom sent out that we are apt to know less about their local variation than we do of rarer species. I have lately seen a specimen from Staines (Middlesex), sent in the Exchange Club box, which had the ground colour pale yellow instead of white. Here the golden scales only occur in the dark latticing, and they seem more loosely attached, for after a few days flight they are all gone, and the insect is white with brown bars. I would be glad to know if this yellow ground colour occurs elsewhere in the South. It reminds me of its near relative, *F. piniaria*, in which the males have a yellow ground in the South and white in the North.

Setting Diurni and Geometræ.

The rule of setting the inner margin of the fore-wings at right angles with

the body may do very well for NOCTUÆ, but the wings of DIURNI and GEOMETRÆ are so much broader, that when this is done with them the costal margin is thrown too far forward. But this is all a matter of taste, and you will acquire it by degrees. For your own cabinet you can, of course, please yourself, but your duplicates must be set to please other people.

Returning Postal Boxes.

You know the Bishop's definition of Orthodoxy and Heterodoxy. "Orthodoxy," said he, "is my doxy, Heterodoxy is the doxy of other people." So with postal boxes. There are, no doubt, good and satisfactory reasons why I do not send back a box by return of post, but I look for mine to be returned promptly all the same, and grumble in my own mind at their delay. Don't you find it so? There is quite an excuse for A's box being yet in *your* possession, but B. ought to have sent back yours. True, he was ill, or said he was, but he should have contrived to return *your* box first. Now, did not some such thought pass through your mind? There are boxes on my desk that I dare not say how long they have lain there, and that undoubtedly ought to have been returned, but don't you know that "What's sauce for the goose is sauce for the gander" is not true when we happen to be the gander ourselves. Nevertheless, return postal boxes promptly, and don't mind the bad example set by those who ought and do know better.

NOTES AND OBSERVATIONS.

THE LITTLE GULL.—A specimen of this rare bird (*Larus minutus*), was shot on Whitburn sands, near Sunderland, on Saturday, August 28th. It is not unfrequently met with on the Durham and Northumberland coast, but has never been seen in the summer plumage. The earliest previous record (Hancock's *Birds of Northumberland and Durham*) is 2nd September.—JOHN E. ROBSON, Hartlepool.

ALBINO FLOWERS.—I have noticed a larger number of white varieties of wild flowers this year, than I ever remember seeing before, including two species I had not previously met with. The species include Columbine; Herb Robert; Rest-harrow, of which in one place nearly all the plants had white flowers, and it was the most abundant plant there; Hyacinth, there were numerous spikes of pale blue flowers, as well as many pure white; Primrose, which I had never seen white before; Viper's Bugloss, this plant appearing in pale blue, violet and white, as well as the normal colour. I also saw a very pale flower of the Mealy or Bird's-eye primrose (*Primula farinosa*.)

Have white or pale flowers been unusually common elsewhere? I have no doubt I might have found many others, had I been looking for plants; these were noticed in my entomological rambles.—IBID.

CHÆRVCOMPANER NERII AT GLASGOW.—Just before going to press Mr. Mackay, of Glasgow, sends me word that a specimen of this rare Hawk moth has been taken at Glasgow. It flew into a room where the window was open and was captured by the cat, which, naturally would not improve its condition. Mr. McKay, will furnish a fuller notice for our next issue. Mr. Gardner's capture last year, was, I believe, the most northerly specimen then recorded, and this is the first time it has been taken in Scotland.—IBID.

THE EXCHANGE CLUB.

I have printed the rules of this successful club on the inner page of cover, in the hope that a few more readers of the *Young Naturalist* will be induced to join it. I have now members enough to fill the three circuits, and also to change some of the boxes each round, but I want another or two who collect Coleoptera and other orders. If a few more join I will be able to form a fourth circuit. I wish also to add a new feature to it. If members will send me lists of their desiderata, I will print them from time to time on the first page. This will enable other members to know what will be most useful, and also to help others who may not be in their own circuit. This, however, must not interfere with the sending out, as at present, any duplicates that may be thought interesting. The members will learn more of the forms various species assume locally by the present method. The other will only therefore be supplementary.

All communications to be addressed—JOHN E. ROBSON, Hartlepool.

EXCHANGE.

* Bred.

DUPLICATES—Larvæ of *Ligniperda*; Pupæ of *Tilia*, *Populi*, *Vinula*, *Bucephala*, *Megacephala*, *Hirtarias*; Imagines of *Edusa*, *Agestis*, *Populi*, *Statices*, *Vinula*. DESIDERATA numerous, especially Diurni.—ARTHUR BATTLE, 28, Amhurst Park, London, N.

DUPLICATES—*Costosa*, *Liturella*, *Hypericella*, *Conterminella*, *Angelicella*, *Nervosa*, *Chærophylli*, *Populella*, *Maculæa*, *Tricolorella*, *Epilobriella*, *Pentadactylus*, all bred, and many other common species. DESIDERATA—many common Micros and Pterophora.—MISS E. HUTCHINSON, Kimbolton, Leominster.

DUPLICATES—*Wavaria**, *Silago**, *Cerago**, *Ferruginea*, *Lota*, *Prunata*, *Alchemillata*, *Strigillaria*, *Multistrigaria*, *Nanata*, *Rupicapraria*, *Elutata*, dark var. *Mundana*. DESIDERATA—*Cardamines*, *Villica*, *Dominula*, *Filipendulæ*, *Jacobæa*, *Rhamni*, *Selens*, *Io*, &c.—J. A. WILSON, 29, Thomson Street, Govan, Glasgow.

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NOTES ON A HOLIDAY IN SUFFOLK.

By F. N. PIERCE, Vice-President, Lancashire and Cheshire
Entomological Society.

IN the first place, perhaps, the title of my paper* is rather vague, for I certainly do not pretend to have collected in the whole of Suffolk, but in one little corner, round about Blaxhall, a few miles from Wickham Market, that being the nearest station. At this station I arrived on Saturday, 26th June, about 8 p.m.; and as I had started from Liverpool about 10 a.m., I had had enough of the luxurious third-class carriages, provided by half-a-dozen railway companies, and was glad to find the trap of my friend Mr. Rope waiting to convey me to my destination. This proved to be the most lovely cottage about that part, and Mrs. Smith, the good hostess, might have been used to the eccentric ways of entomologists all her life, so well did she look after my comforts. Here I left my apparatus, and getting in the trap again was quickly driven to Mr. Rope's fine old country house, covered with roses and creepers. There was a lovely flower garden, containing some large *Syringa* bushes, which were attractive to moths; attached to the garden was an orchard, and a plantation of no mean extent, that would make any lover of nature speechless with delight. Picture a plantation where everything is left to nature, and only aided by the proprietor in making it really natural. No finely trimmed edges here, with straight monotonous lines, and walks that remind one of a house floor, but rugged paths, with rough banks of stone, over which the beautiful blue and white *Periwinkle* grow as they think best; wild wood flowers at every step, and curious trees, including the extraordinary *Butcher's Broom*, which grows wild in the district, the flower of which grows from the centre of its prickly leaf. At the bottom of the plantation was a small duck pond, and growing in the middle was an enormous *Royal fern*, the finest specimen I have ever seen. Nor can I finish

* Read at a meeting of the Lancashire and Cheshire Entomological Society.

this meagre description of such a lovely fairy spot, without alluding to a fair-sized summer house, whose inside walls were entirely covered with different species of sea-shore shells, arranged in geometrical patterns, and filled in here and there with onyx and cornelian stones; the ceiling was ornamented with seaweeds, and looked wonderfully pretty. Altogether it was a most picturesque spot, and from the number of shells used one would imagine it would take a life-time to collect them. This, then, was the place I was conducted to, and after partaking of substantial refreshments, Mr. Rope led me round the plantation, where he had treaced a few trees. *Noctua festiva* and *Dipterygia pinastri* were common, also a few *Grammesia trilinea* and *Rusina tenebrosa*. Fancy this, ye hard-working town entomologists, to be able to sugar in your own garden, and take the grand things I will proceed to enumerate. After looking at one or two trees we went back into the house to see his collection. He had not been working hard, but had some good insects, which were the more interesting from having been taken right in the district (in fact in his own garden); among which I may just mention an *Antiopa*, *Colias hyale* and *edusa*, *Thecla W-album*, three or four *Sphinx convolvuli*, *Demas coryli*, *Toxocampa pastinum*, *Notodonta palpina*, *Cirrhoëdia xerampelina*; and while thus employed, *Timandra amataria* flew in at the open window to the light. With such a display, I was already well satisfied with the ground I was to work on, especially as Mr. Hope assured me he had scarcely worked at all; so with great expectations I went home to get ready for the fray.

The country is about six miles from the sea coast, and has a fine river, which rises some eight or nine feet with the tide, and as the weather was exceedingly hot, I availed myself of its cooling influence once or twice a day. The country is rather flat, but has plenty of gently rising ground, the woods are small but very nice to work in. The one we principally worked in was composed of fir, oak, elm, poplar and willow, with a great quantity of thick underwood; on the left was a heathy common extending miles, on which I took the little *Crambus cerussellus*. All this struck me as being good ground to work on, especially as the hedges were old and very high. Along the bank of the river were tall sedges, out of which I took several *Crambus perlellus*. These seem to be different from the ordinary form of this insect. I sent them to Mr. J. E. Robson, who writes in a letter: "Your *perlellus* are a most interesting lot, and are decidedly more *Warringtonellus*-like than what I take; even the palest of them has the golden hue of that species; I see clearly I shall have to get sets of both from all places I can. Both occur here (Hartlepool). I have taken perhaps 40 *perlellus*, and none of them are so dark as your darkest, and while your palest are tinged with yellow, mine are pure silver." The dark local varieties of our mosses are usually supposed to

be produced from the colour of the peaty soil, but my opinion is that it is the wet, not the soil. Here we have *Warringtonellus* (which are like very dark *perlellus*), occurring on wet moss land, and *perlellus* taken from the wet river bank, being very dark and almost approaching *Warringtonellus*, though the nature of the soil is entirely different.

Along the bank or wall of the river were large quantities of thistles and nettles, but butterflies were exceedingly scarce. I saw one large batch of *Vanessa Io* larvæ, and *urtica* was not uncommon on nettles. I could not detect any *cardui* on the thistles, but was, perhaps, a trifle early. *Satyrus janira* and *pamphilus* were common, and occasionally a hibernated *urtica*; but these were all the Diurni I saw, except two *Hesperia sylvanus*, which I took in a lane. I believe I was a month too early for butterflies, as Mr. Rope had taken so many of our British species in the locality.

The poplars were terribly infested with the larvæ of *Sesia apiformis*, but although I made a point of walking round the trees in the early morning, I did not succeed in taking any imagines. *Cossus ligniperda* was also in the willow and poplar trees, the strong odour quickly acting as a guide to the infected trees; but I did not find any, my nearest approach was one night as the odour was very strong in a lane, I lighted my lantern, and was led to a tree some twenty yards off, and as it was so strong made sure of a catch, but all I found was the empty pupa case. *Fidonia piniaria* occurred in the fir woods, and was the usual southern variety, with dusky yellow blotches on the wings. I was sorry I was not able to catch a female, as I should like to have seen the southern form. We seem to take both varieties of this sex here. In the same plantation, Mr. Rope had taken *Nola cristulalis*, a few weeks before, sitting on the fir trees.

The collecting during the day was not much, but the great time was when evening came on, then the four Acidalias—*Incanaria*, *Bisetata*, *Osseata*, and *Scutulata*, began to fly in hundreds, the difficulty was to see which of the game was worth taking. There might have been other species among them, but these four were the only ones I saw.

Along one hedge, by what was called "The Fudder Covey," (in plain English The Further Covey), I succeeded in taking a specimen of *Lithosia complanula*, which, from its lovely condition seemed just coming out. As I left I also took *Scopula lutealis*, *Plusia iota*, and *chrysitis*, flying over the brambles. Inside the "Fudder Covey," *Scopula olivalis* and *Lomaspilis marginata* were perfect pests, flying up every moment. *Hepialus hectus* was also there, with its soft monotonous whirl. Beating the underwood, after putting on our sugar, was decidedly paying; for we would take the most beautiful specimens of *Metrocampa margaritaria*, besides odd specimens of *Melanippe montanata*,

unangulata, *bilineata*, *Acidalia imitaria*, *Abrostola urticae*, *Emmelesia affinitata* and *decolorata*, *Boarmia repandata*, *Corycia temerata*, &c. Then came the time for examining our sugars (about 9.30). I may remark that I could not get treacle, but used black sugar, which Mr. Kope got from Saxmundham, some three or four miles away, boiled in beer, to which was added a fair proportion of rum. Then there was a sight for a lepidopterist, aye, and a coleopterist would benefit by sugaring also, for moths swarmed on each patch, and beetles too. As a rule we took *Dipterygia pinastri*, which I really believe was the commonest moth at sugar; *Leucania pallens*, *impura*, which was very scarce compared with its near relative; *Xylophasia rurea*, *Polydon*, *Lithoxylea*, and *Hepatica*, which were in splendid condition; *Leucania camma*; *Mamestra brassicae* was also very scarce, and much lighter than our form, in fact quite a warm colour, nearly approaching *Gemina*, of which we took a few, including one of the variety *Remissa*; two *Mamestra anceps*; *Apamea oculatea* only a few dark specimens, I was rather disappointed in this, I had hoped to get a large and variable series. *Miana fasciuncula*, *furuncula*, and *strigilis* occurred in vast numbers; *Strigilis* was especially interesting; The variety *Præduncula*, with white hind-margin, was quite common, in fact I never saw so many of this form as I did on those trees; the rich brownish green form (*Latriuncula*) occurred, but I do not think they were more plentiful than *Præduncula*. *Ethiops* was absent, I could not get one as dark as what we take here or what I have received from London; it is curious to note that the light variety *Præduncula* is by far the largest, and the black, *Ethiops* the smallest, the size increasing as the insect gets lighter. The sugar was also visited by *Grammesia trilinea*, *Caradrina morpheus*, *Rusina tenebrosa*, which was finer marked and very much lighter than we take; two specimens of *Agrotis valligera*, light form; *Exclamationis* and *Segetum* were abundant, among the latter were some very black form. The *Noctuas* were well represented by a few specimens of *Augur*, *C.-nigrum*, *Plecta*, *Triangulum*, *Brunnea*, and *Festiva*, with the exception of the latter, they were all normal forms. *Festiva* was very variable, the very red forms greatly predominating. I only took one *Orthosia upsilon*; I had hoped to take the red southern variety, but this was exactly our form. Then would come the treat of the evening, for as we had nearly finished, and were preparing to go home, we would be encouraged, if that was necessary, by a large noctua daintily sipping our sweets. No mistaking that, *Aplecta advena* in all its glory, but not greedily, for she invariably waited till the more common fry had supped, before condescending to attend the feast. *Gonoptera libatrix* was also there, hibernated but still fine; *Hadena oleracea* was scarce, but rich in colour; also *Hadena dentina*. This then was what we would take in the "Fudder

Covey," though, sometimes, we would count from 15 to 20 moths on each patch, the next night we would scarcely see one. On one of these latter nights I sugared in the plantation adjoining the house, and tree after tree produced nothing, until I came to one on which sat a moth I had not seen before, but as soon as I made sure of it I saw it was a fine female *Cymatophora ocularis*. Then came the question. Merrin says, "Noisy when boxed." I had my killing bottle with me, should I kill it in perfect condition, or run the risk of having a worn specimen, with a chance of eggs which might or might not prove fertile? There is an old proverb, which is quite as old as the goose with the golden eggs, which says, "A bird in the hand is worth two in the bush"; so, as at that moment, my *ocularis* commenced fluttering I popped her into the bottle, and in a few seconds all was over. But, although I stayed late that night, I only took four moths, two *Dipterygia pinastri* and two *Noctua festiva*, and no more *ocularis* during my stay.

Although *Dipterygia pinastri* was very acceptable to me, we had heard of another moth bearing the same specific name, though in a different genus, for had not the *Sphinx pinastri* been reported as taken near Ipswich; and there being a good old fir wood, by name Botany Bay, close by, with plenty of honeysuckle growing near, what was to prevent us from taking this rare Hawk. So one evening found us at Botany Bay wood, which we carefully treacled, and then took up our position, each before a large patch of honeysuckle, and there remained for the Sphinx. I don't know that either of us had provided ourselves with pill boxes large enough in case of a catch, I certainly had not. However, it did not much matter, for no *Pinastri* visited the honeysuckle while we were there. While waiting we succeeded in netting a fine series of *Acidalia subsericeata*, besides taking a few specimens of *Ellopija fasciaria* and *Crambus pinetellus* in the wood. The sugar yielded some nice specimens of *Leucania lithargyria* and *conigera*, as well as some of those already mentioned. In another wood, the "Covey Plantation," I took the only specimen of *Acidalia emarginata* I got, though the year before it had swarmed. Early again I suppose. In this wood we had the best and worst nights' sugaring we had while I was there. The first night the sugars were covered, the difficulty was to pick out what were the best things to take; the next night we went again and absolutely took nothing at all, I don't think we saw half-a-dozen moths all night. On the first night we took specimens of *Acronycta psi*, *rumicis aceris*, *Thyatira batis* and *derasa*, a few worn specimens of *Apamea unanimitis*. I also took at odd times specimens of *Eubolia cervinaria*, *Eupithecia rectangularata* (green form), *Dianthæcia capsicola* flying over the white lychnis. Later on *Carpophaga* larvæ were taken in the seed capsules of *Silene inflata*. Light was not very productive. It may have been owing to the late hour

I got home after sugaring, but *Caradrina morpheus* was not uncommon; *Leucania pallens*, *Arctia menthastris* and *lubricepeda* were common, and I took one male *Euthemonia rusula*.

Micros were very scarce. I took *Xanthosetia zægana*, *Crambus hortuellus*, *tristellus* and *selasellus* along the wall of the river, and a very pretty *Tortrix* which I am sorry to say I have not yet named, was very abundant on the trunks of the poplar trees along the river. *Dicrorampha sequana* might be knocked out of the hedges, along with *Dictyopteryx læflingana*, *Bergmaniana*, and *Argyrotoza Conwayana*; beating the underwood in the plantation covey would scare out *Rivula sericealis*. In the stables near Hatcheston, a little village a few miles off, *Pyralis costalis* occurred freely, and *Farinalis* was plentiful in all the stables. A single specimen of *Pterophorus microdactylus* was taken.

That extraordinary little Pyrale *Acentropus niveus*, occurred in a shallow pond some miles from where we were staying, but owing to their propensity of drowning themselves in this muddy pond, they are almost impossible to get, in anything like fit condition for the cabinet. *Schænobius gigantellus*, *Cledeobia angustalis*, *Hydrocampa nymphæalis* and *stagnalis*, *Herbula cæspitalis*, *Zyggena filipendulæ*, *Procris statices*, and *Cerigo cytherea* also occurred here.

I did very little in larvæ, but *Botys verticalis* was plentiful in rolled-up nettle leaves, and we found a batch of the handsome *Cucullia verbasci* on mullein, in Mr. Rope's kitchen garden. *Hydræcia petasitis* in the roots of *Petasitis vulgaris*, and *Petasia cassinea* was beaten from oak.

Just a remark about the weather. I had only one wet day, the rest of the fortnight was very hot and dry, and I am told by the people living there that it is an exceedingly hot county. While I was there everything was scorched and dried up, and the farmers were getting quite anxious about their crops. I believe they had a spell of six or seven weeks with scarcely an hour's rain, but the week after I left the rain came and greatly improved the prospects of the harvest.

There was a large piece of salt marsh near Aldborough, but I could not find a single lepidopteron of any description on it, though I searched it well during the day-time, in hope of getting a good micro or two.

In point of numbers, in 1882, at Norfolk, the same time of year I took about 63 species of macros; in 1883, at Windermere, 50 species; in 1884, at the New Forest, 73 species; in 1885, I was away in September; this year at Suffolk I have taken 77 species. The small take at the North was, I have no doubt, owing to the wretched weather, as we had only one fine day in the whole fortnight—the other numbers are fairly equal.

NOTES ON LEPIDOPTERA.

By B. LOCKYER.

(Continued from page 200.)

FIDONIA PINIARIA.—Flying round firs at some height from the ground in the day-time. May. West Wickham and the New Forest.

ASPILATES CITRARIA.—To be kicked up on weedy banks near the coast. August. Also on gas lamps. Southend, Essex.

ABRAXAS ULMATA.—May and June. "Ballards," Addington. By beating and mothing. Larvæ near Tintern, Monmouth. August.

LIGDIA ADUSTATA.—To be beaten from bushes by day, or taken flying rapidly along woodland paths in the evening in the New Forest. May.

LOMASPILIS MARGINATA.—By beating and mothing in woods. May and June. Highgate, Hampstead, Surrey, Combe, New Forest, West Wickham.

LARENTIA DIDYMATA.—Common about blackberry bloom and bushes on outskirts of woods. Larvæ on low plants under the shade of same bushes. Bishop's Wood, Hampstead, Highgate Wood. June. Rather local.

L. OLIVATA.—Very common, especially haunting *Clematis vitalba*, and among bedstraw along precipitous banks of the Wyndcliff and other parts of the banks of the River Wye, near Chepstow, Monmouth. Beating and mothing. July and August.

L. PECTINITARIA.—By beating bushes near and mothing over heather (even small patches in woods), all round Lyndhurst (Matley Heath, Denny Wood, &c.) May and June.

EMMELESIA DECOLORATA.—Very local. Abundant along hedgerows where the food-plant is common. Flies in a weak jerky manner about dusk. I have had six or more in the net at once, and could not pin them fast enough. Only occurred by a hedge between Bishop's Wood, Hampstead, and the heath, (skirting two sides of a field.) Lays readily in a chip box. May and June.

EUPITHECIA VENOSATA.—One just out of the pupa near Eastwood (Southend), Essex, in a very weedy lane between fields of mustard, &c. June.

E. CENTAUREATA.—To be taken amongst rank herbage and in gardens where the larvæ eat the petals of cultivated geranium.) Also fond of settling on glass windows, walls, fences, &c., comes to light, and flowers of Rumex. May and June.

E. SUBNOTATA.—At light and on palings near waste places. June and July. Emerges from pupa in the afternoon, and may then be taken expand-

ing its wings on the palings. Also to be taken about flowers of *Chenopodium* and at light. Highgate and parts of the northern suburbs of London. June and July.

E. VULGATA.—On fences, walls, gas lamps, and by mothing in gardens and fields. All about North London, especially Highgate. May and June.

E. EXIGUATA.—Once bred from a larva found on birch at Bishop's Wood, Hampstead, in the autumn.

E. CORONATA.—On fences at the beginning of July. Millfield Lane, Highgate, only once, and at Yarmouth (South Town, Suffolk), August, 1879, on a garden wall, near a magnificent *Clematis* plant.

LOBOPHORA VIRETATA.—At sugar, August. New Forest. Rare. At rest, Bishop's Fence, Shirley Mayes.

MELANTHIA RUBIGINATA.—Once flying about alder on an evening in July. Matley Heath, New Forest.

M. OCELLATA.—Beaten out of bramble, &c., by day, also by mothing, and at sugar. May to August. Highgate, Hampstead, and woods about Lyndhurst. Not very common.

M. ALBICILLATA.—Flying in the skipping fashion peculiar to so many *Geometræ*, over and near *Rubus fruticosus*, in the oldest portions of the unenclosed woods (Denny Wood and Hollands Wood, New Forest), also at sugar and beaten by day. July. Commoner than the last.

MELANIPPE UNANGULATA.—One, resting on a leaf in the Lowestoft High Road, Suffolk (near Bradwell), August, 1879.

M. SUBTRISTATA.—May to July. By beating and mothing, and at sugar. Highgate, Hampstead, and New Forest woods and plantations.

M. MONTANATA.—By beating and mothing in May and June. Bishop's Wood, Hampstead (used to be common), Combe Wood, Surrey, and Pond Head Inclosure, Lyndhurst, also West Wickham Wood.

M. FLUCTUATA.—May to July. At rest on walls, leaves in hedges, &c. fences (near the top), on gas lamps, by mothing, and on flowers of low plants in fields, gardens, and lanes everywhere. August and September.

ANTICLEA BADIATA.—By mothing, beating by day, and at rest on fences. April. Cricklewood, Middlesex, and near Lyndhurst (Beechen Lane.) Not very common.

A. DERIVATA.—By mothing near wild rose, and on fences near gardens, also by beating. April and May. Highgate, and Beechen Lane, Lyndhurst, also Cricklewood.

COREMIA PROPUGNATA.—At rest on windows and by mothing. Woods and gardens. May. Rare. New Forest, also at West Wickham.

C. FERRUGATA.—Beaten out by day and by mothing in the evening. May to August. West Wickham, near Yarmouth, and in the New Forest.

CAMPTOGRAMMA BILINEATA.—By beating hedges, weedy banks, &c. Flies by night about rank herbage, lanes, fields, and woods; also at light. June to August.

SCOTOSIA DUBITATA.—At light, and flying about Clematis in the evening. August and September. Rare. Wyndcliff, Chepstow, and Camden Town, London.

S. CERTATA.—Common where its food-plants, *Berberis vulgaris* or Holly Barberry grow. By mothing (only on warm evenings), and on gas lamps. Near Tufnell Park, and other suburbs of North London; one of the best localities is now built over. The pale yellow ova may be found on the upper side of the leaves of the food-plant at the beginning of June. The larvæ are very easy to rear, *Berberis vulgaris* is their favourite food-plant; they become smaller moths when fed on the holly barberry. May.

CIDARIA PSITTACATA.—Larvæ not common on oak. New Forest. August.

C. CORYLATA.—By beating bushes in woods, in May and June. West Wickham, and Bishop's Wood, Hampstead.

C. RUSSATA and *IMMANATA*.—To be disturbed from bushes by day, and in the autumn in the New Forest taken at sugar; also at rest on palings. May, June, August, and September. New Forest and (*C. russata*) Bishop's Wood, Tufnell Park, West Wickham, also near Highgate. The autumnal varieties of *C. russata* taken at Lyndhurst (wrongly named by me in the "Entomologist" *C. immanata*), are very peculiar. Not blotched with the flaming colours of the Scotch specimens, but marked with well-defined narrow bands, and lines of blue grey, hoary grey, dull red and black. The form of the boundary lines (as named in "Stainton's Manual" "Newman's British Moths," is as in ordinary varieties, but the general appearance is more "satiny" and less powdery. There is one variety more nearly approaching the ordinary forms wherein the centre of the wing is filled up with the hoary colour, the deeper tints only appearing as the commencement of the four lines especially near the apex. Is it generally known that the larvæ feed on bramble? In Middlesex they are to be taken on it by night in April, and under leaves of dock in lanes by day.

C. SILACEATA.—Once, by beating bushes in Park Ground Inclosure, New Forest. May.

APTEROUS FEMALES.

HELPLESS FEMALES! NATURALISTS TO THE RESCUE !!

MY DEAR EDITOR,

I am glad to see another knight take up the cause of the unfortunate wingless females, about which a great deal has been written but about which a great deal more remains to be written before this knotty point is solved.

Mr. Cross speaks of *P. pilosaria* and *H. defoliaria* as not having "even a stump nor the slightest evidence that there has ever been one," almost quoting word for word what Mr. Stainton says in his Manual; and, to the casual observer, they have no wings, but, for such a keen observer as Mr. Cross I am surprised at such a statement, and really, Sir, I must beg most emphatically to state that they have stumps, which I doubt not, at one time have been wings. So astonished was I at his assertion, "slightest evidence" indeed, that I immediately went home, perusing the remaining contents of the *Y.N.* on the way, and spent several hours at the microscope hunting for wings. I think I can see the quiet grin that will light up Mr. Cross's face when he reads this, and hear him say "if it takes him several hours to find a wing on the female they must indeed be small" but, not so, I had no difficulty in finding a wing, in fact four wings, on both *P. pilosaria* and *H. defoliaria*, and the rest of the time was spent in examining other helpless females, which resulted in my making the following notes on the spot.

1. *H. defoliaria*.—Female wings very small, scaled, with scale cilia, no veins.

2. *P. pilosaria*.—Females wings very small, scaled, with hair cilia.

3. *N. zonaria*.—Female wings scaled very thinly, but clothed with hair emitted from all parts of both wings; when denuded there are slight traces of thick veins.

4. *O. antiqua*.—Female wings larger, densely clothed with hair, under which are smaller scales than in the male, when denuded the veins are distinctly visible, but in what shape? Instead of being straight, like fully developed wings, they are all twisted and zigzag, reminding one of a corkscrew flattened.

5. *C. brumata*.—Female wings thickly scaled, hair cilia, scales larger than in the male.

6. *H. aurantiaria*.—Thickly scaled, hair cilia.

7. *H. progemma*.—Scaled and veined, cilia has scales and hair mixed.

I think this will prove that *P. pilosaria* and *H. defoliaria* have stumps, and pretty good evidence that they have originally been wings. In three-

winged males I was quite unsuccessful in finding the slightest trace of a fourth wing, even microscopically, though I do not say it was not there.

I would also like to point out an important fact that seems to have quite escaped notice, that is, that in certain pupæ of wingless females there are no wing cases. I have not specimens by me at present, but I believe I am correct in saying that *O. antiqua*, *Pseudo-bombycella*, and the *Psycidæ* have no wing cases, but *Hybernias* and *N. zonaria* have as long wing cases as the male.

There is also a hint thrown out in the "Intelligencer," which conveys the idea that certain insects, which at other places have fully developed wings, are found at Madeira to have lost their wings.

One more grievance. Mr Cross's notion of the large wings of the male is absurd, and I cannot see where his conclusive evidence comes in. He has, or I should ask him if he has, ever seen a fly carry its partner, and yet we do not find the male fly, with wings several hundred times larger than his mate—it would look rather ridiculous if he had—and if a fly can carry his winged partner, it is not *necessary* for the female *brumata* to be semi-apterous in order that her spouse may carry her.—Yours truly, F. N. PIERCE.

143, Smithdown Lane, Liverpool.

THE PARASITES OF OUR BUTTERFLIES.

By G. C. BIGNELL, F.E.S.

I have been looking carefully through the entomological magazines of the last twenty years, with the endeavour to find out all the records of the parasites from lepidopterous larvæ during that period, and I am astonished I have found so very few; in fact I find scarcely any at all until within the last seven years. The reason, of course, cannot be that no parasites were bred, it must rather be that books on the subject are not to be had, so collectors generally cannot find out the names of such parasites as appear in their cages.

No doubt beginners don't like the disappointment of seeing an ichneumon emerge, instead of the expected butterfly or moth, still I can assure them, from my own experience, that if they will turn their attention to the ichneumons, they will find the study extremely interesting.

There are many points in the life-history of these parasites, which, to the mind of one who is willing to be taught, show forth the wisdom of the Great Creator's work, and there is wonderful interest to be found in considering what I may call the balance of life, which through the agency of these small creatures is continually kept up.

That the study of the parasites has begun to show signs of vitality is greatly owing to the kindness of Messrs. Bridgman and Fitch, in naming bred or captured specimens for ignoramuses; I am sure I am myself greatly indebted to them for such help.

The following list shows what has been already done with the parasites of our butterflies; some notes at the end will point out what ought to be done in this group.

Host.	Parasite.	By whom bred.
P. BRASSICÆ ...	1. <i>Hemiteles fulvipes</i> ...	G. C. Bignell.
	2. <i>Mesochorus aciculatus</i> ...	do.
	<i>Apanteles glomeratus</i> ...	By many.
	„ <i>rubripes</i> ...	P. Cameron.
P. RAPÆ ...	1. <i>Hemiteles fulvipes</i> ...	G. C. Bignell.
	2. <i>Mesochorus aciculatus</i> ...	do.
	<i>Apanteles glomeratus</i> ...	By many.
	„ <i>rubecula</i> ...	G. C. Bignell.
...	3. <i>Pteromalus puparum</i> ...	do.
...	4. <i>Exorista vulgaris</i> ...	do.
		J. E. Fletcher.
P. DAPLIDICE ...	5. <i>Anomalon xanthopus</i> ...	G. F. Mathew.
G. RHAMNI ...	6. <i>Limneria vulgaris</i> ...	G. C. Bignell.
	7. <i>Mesochorus gracilentus</i> ...	do.
T. BETULÆ ...	<i>Agrypon flaveolatum</i> ...	do.
	<i>Campoplex pugillator</i> ...	T. Eedle.
	„ <i>eurynotus</i> ...	do.
T. W-ALBUM ...	<i>Perilitus scutellator</i> ...	V. R. Perkins.
L. ALSUS ...	<i>Limneria sordida</i> ...	W. H. B. Fletcher.
	8. <i>Mesochorus confusus</i> ...	do.
L. ALEXIS ...	<i>Apanteles zygænarum</i> ...	do.
P. ATALANTA ...	<i>Amblyteles armatorius</i> ...	T. A. Marshall.
	<i>Hemiteles fulvipes</i> ...	J. B. Bridgman.
	<i>Limneria cursitans</i> ...	H. M. Golding-Bird.
	„ <i>majalis</i> ...	Mrs. Norgate.
	9. <i>Mesochorus sylvarum</i> ...	G. C. Bignell.
...	<i>Apanteles fulvipes</i> ...	do.
...	<i>Microgaster subcompletus</i> ...	Mrs. Norgate.
		J. Hellins
P. CARDUI ...	<i>Limneria exareolata</i> ...	G. C. Bignell.

Host.	Parasite.	By whom bred.
...	<i>Pimpla diluta</i>	... C. G. Barrett. J. B. Bridgeman.
...	<i>Bracon variator</i>	... F. N. Pierce.
...	<i>Apanteles emarginatus</i>	... do.
V. URTICÆ	<i>Limneria uncinata</i>	... G. C. Bignell.
...	<i>Apanteles spurius</i>	... do.
...	„ <i>rubripes</i>	... M. J. Harding.
...	3. <i>Pteromalus puparum</i>	... R. M. Sotheby. G. C. Bignell.
V. C-ALBUM	<i>Pimpla flavonotata</i>	... W. H. Harwood.
...	3. <i>Pteromalus puparum</i>	... do.
M. ARTEMIS	<i>Apanteles Bignellii</i>	... G. C. Bignell.
...	„ <i>spurius</i>	... G. C. Bignell, J. E. Robson and others.
A. PAPHIA	<i>Amblyteles castigator</i>	... G. C. Bignell.
...	„ <i>homocerus</i>	... do.
...	10. <i>Hemiteles melanarius</i>	... F. C. Lemann.
E. JANIRA	<i>Apanteles tetricus</i>	... G. C. Bignell.
...	„ <i>nothus</i>	... do.
F. TITHONUS	11. <i>Rhogas tristis</i>	... do.

The omissions in the above list seem remarkable. For instance the imago of *P. machaon* is bred annually in hundreds from pupæ taken in the fens, surely some of these pupæ result in parasites, but not a single instance of such a thing has been recorded.

The larvæ of *P. napi*, being much like that of *rapæ*, perhaps the latter has been credited with the parasites of the former; in the volume published in 1885, by the Ray Society, and containing Mr. Buckler's figures of the butter-

Nos. 1 and 2 are hyper-parasites on *A. glomeratus*.

No. 3. One of the *Chalcidida*, bred from the pupa.

No. 4. A dipteran, generally escaping from the larva, but sometimes changing within the pupa of the victim.

No. 5. Pupa from Baklar, Turkey. The parasite has been captured in Devonshire, and bred from a *Noctua*, by Bridgman.

No. 6. This parasite does not leave its host, but forms a pupa within, consequently the skin of the unfortunate larva gives it an extra protection.

No. 7. Hyper-parasite on *L. vulgaris*.

No. 8. I have not the slightest doubt but that this is the hyper-parasite of *L. sordida*.

No. 9. Hyper-parasite on *M. subcompletus*.

No. 10. This is generally a hyper-parasite, but no trace of a victim could be found, consequently I presume it was a direct parasite.

No. 11. The same remarks apply to this species as to *L. vulgaris* in note 6.

fly larvæ, the points by which the larva of *Napi* may be known are thus given: "The larva of *Napi* is very much like that of *rapæ*, but can be known from it by its lighter green, by the absence of a yellow dorsal line, by the single yellow spot in each segment enclosing the spiracle, and by the absence of black dots below the spiracular line." The larvæ of *Thecla quercus* are beaten in great numbers from the oak every June, but there is no record of the breeding of a parasite; its congener *Thecla betula*, which is much less common, furnishes no less than three names in our list.

Probably it is so troublesome to search for caterpillars, feeding on low-growing plants, such as those of *Cardamines*, *Sinapis*, and many others, that but few captured larvæ come under observation.

Can any of your readers increase the list now at once from their own experience? or if not now, will those who rear lepidopterous larvæ kindly preserve all the parasites they breed, and, at all events, send them with the names of their hosts to someone who is studying the subject. As the Bay Society issues each portion of the larvæ of our lepidoptera, it is desired to give a list of the parasites furnished by the species figured, so that there is this definite object in bestowing some little trouble on the matter.

I hope in future numbers of the *Young Naturalist* to show what is known of the parasites of the moths.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

October 6, 1886. ROBERT M'LACHLAN, Esq., F.R.S., President, in the chair.

Mr. W. Bartlett Calvert, of Santiago, Chili, was elected a Fellow.

Mr. M'Lachlan exhibited a number of seeds of a Mexican species of *Euphorbiaceæ*, popularly known as "jumping seeds," recently received by him from the Royal Horticultural Society. He stated that these seeds are known to be infested with the larvæ of a species of *Tortricidæ*, allied to the apple *Tortrix*; they were first noticed by Prof. Westwood, at a meeting of the Society held on the 7th June, 1858, and the moths bred therefrom were described by him as *Carpocapsa saltitans* (cf. Proc. Ent. Soc., 2nd series, vol. v., p. 27). These seeds have since from time to time been referred to both in the United Kingdom and America. A discussion ensued in which Mr. Pascoe, Mr. Poulton, Mr. Roland Trimen and others took part.

Mr. Roland Trimen exhibited, and read notes on, some singular seed-like objects found in the nests of *Termites*, and also in those of true ants, in South

Africa. They were apparently of the same nature as those from the West Indies, described in 1833 by the Rev. L. Guilding as *Margarodes formicarius*, which was usually referred to the *Coccidæ*, as allied to *Porphyrophora*. They were of various shades from yellowish pearly to golden and copper colour, and were strung together by the natives like beads, and used by them as necklaces and other personal ornaments, as, according to Mr. Guilding, was the case with the West Indian species.

Mr. W. F. Kirby exhibited, on behalf of Mr. John Thorpe, of Middleton, a long series of buff and melanic varieties of *Amphidasis betularia*, and read notes on them communicated by Mr. Thorpe. Mr. Kirby also exhibited on behalf of Mr. Nunney, who was present as a visitor, a dark variety of *Argynnis aglaia* from Caithness, and a tawny-coloured variety of *Vanessa urticae* from Bournemouth.

Mons. Alfred Wailly exhibited a fine series of Saturnias and other Bombyces, mostly bred by him, from South Africa; also specimens of *Dirphia tarquinia*, *Attacus orizaba*, *Platysamia cecropia* and *P. ceanothi*, *Callosamia angulifera*, *C. promethæa*, *Philosamia cynthia*, and other species from Central America. He also exhibited ova of *Saturnia tyrrhea*, pupæ of this and other South African species, and a cocoon of *Bombyx ochadama* from Madagascar. Mons. Wailly stated that several of the large South African *Saturnidæ* formed no cocoons, the larvæ entering the earth to undergo the change to the pupal state. Mr. Trimen said he was able to confirm this statement.

The Rev. W. W. Fowler exhibited a number of minute *Acari*, which had been doing injury to fruit trees near Lincoln.

Mr. Poulton gave an account of the experiments recently made by him with the larvæ of several species of the genus *Vanessa*, for the purpose of ascertaining the relations of pupal colour to that of the surface on which the larval skin was thrown off, which had formed the subject of a paper read by him last month before the British Association. He also exhibited the frame constructed by him for the purpose of these experiments. The President and Messrs. Trimen, Waterhouse, White, Hall and others took part in the discussion which ensued.

Mr. Slater exhibited a specimen of *Prionus coriarius* found in Devonshire on fennel, and a specimen of *Calandra palmarum* found alive at Pembroke Dock.

Mr. Enock exhibited *Mymar pulchellus*, and a specimen of *Atypus piceus* recently taken on Hampstead Heath.

Mr. Elisha exhibited a series of *Gelechia hippophaëlla* (Sch.), bred from larvæ collected at Deal on *Hippophaë rhamnoides*.

Mr. Billups exhibited *Echthrus lancifer*, Gr., a species of *Ichneumonidæ* new

to Britain, taken at Walmer on the 15th August last. He remarked that Brischke had bred members of this genus from *Sesia spheciformis*, *S. formiciformis*, and *Leucania obsoleta*; but that in this country the genus was little known, only one species (*Echthrus reluctator*) being mentioned in Marshall's list of British *Ichneumonidæ*.

Mr. E. A. Butler exhibited a male and female of *Macrocoleus tanacetii* from Bramley, near Guildford; living specimens of *Chilacis typhæ*, received from the Rev. E. N. Bloomfield, of Guestling, Hastings; and a pair of *Harpalus discoideus*, obtained in August last, on a heath near Chilworth, Surrey.

Mr. A. J. Rose exhibited specimens of a mountain form of *Lycæna virgaurea*, recently collected by him in Norway.

Mr. Champion exhibited *Teratocoris antennatus* and *Drymus pilicornis*, taken near Sheerness.

Mr. W. White exhibited specimens of *Proctotypes ater* (Nees); he also exhibited a specimen of *Chelonia caja* with abnormal antennæ, and read notes on the subject.

Mr. Elisha read a paper "On the life-history of *Geometra smaragdaria*."

Mr. C. O. Waterhouse communicated a paper "On the Tea-bugs of India and Java."

During the meeting a telegram was received from Mr. Freeman, of Plymouth, announcing the recent capture in Cornwall, of *Anosia pleurippus*.

—H. Goss, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

A very interesting discussion on the habits of *Cænonympha typhon* took place at the meeting held September 30th, there being a very large attendance of members. Mr. Anderson, in speaking of the variations of this remarkable species, drew attention to the great value of the list now appearing in the *Young Naturalist*, for giving the particulars and named varieties of the various species, and quoted from the same regarding the four vars. *Laidion*, *Philoxenus* or *Rothliebii*, *Isis*, and *Orcadæ*. Mr. Edle in the course of his remarks said the variations were undoubtedly caused by the geographical distribution, thus specimens captured in Ireland were very different from those taken near Manchester, but all the variations were certainly one species. It was generally found on mountains, in fact he never took it under 2,000 feet elevation, but, of course, the moors round Manchester were considerably lower. After giving particulars of his experience of this insect in Scotland, where he had met with it very commonly, Mr. Edle stated that in ascending the mountains the first species observed was *E. Blandina*, which frequented boggy places, never above 200 elevation, continuing the ascent he found *C.*

typhon, and at the extreme heights were the haunts of *E. cassiope*, which might be described as a true Alpine species. He also mentioned that the *C. pamphilus* found on the Scotch mountains were much larger than those found in England.

Among the exhibits on the table must be mentioned a fine specimen of *P. phlaeas* var. *Schmidtii*, *N. Bondii*, and two *D. albimacula*, by Mr. Edle. Some fine *Arctia urticae* by Mr. Clark, including one having no spots whatever, being pure white on all wings. Mr. Pearson showed some *C. diluta*, together with cocoon and pupa case of same, also *C. diffinis* and *H. protea*. Mr. Lewcock had a fine boxful of Coleoptera, including *Gibbium scotius*, *Celiodes exiguus*, *Bembidium lunatum*, *B. concinuum*, six species of *Telephorus*, several *Sitones*, *Hypera*, *Aphodius*, &c.

At the following meeting Mr. Pearson brought forward for discussion the life history of *C. pamphilus*. He commenced by stating that the geographical range of this common species extended from our own country throughout Europe, and the North and West of Asia. Though most authors state the insect to be double-brooded, his own observations led him to conclude that a succession of broods took place, since the insects could be observed from May to October. Mr. Pearson then gave a description of the larva, and passed on to the subject of the two varieties *lyllus* and *albescens*, mentioning that he had taken the former at Croydon on the chalk, and the latter at Colney Hatch on a clay soil, which was contrary to the usual order of things—a chalk formation generally produced light forms of any species. He also drew attention to the fact that this species, unlike most of the Diurni, seemed as well pleased with the absence of sunshine as with its presence, so that on dull days the entomologist was frequently cheered by observing this species when the locality would otherwise seem devoid of insect life. Mr. Harper mentioned that the var. *lyllus* could be obtained on Wanstead Flats, and also stated that some very large pale forms were met with at Croydon. Mr. Clark who exhibited some fine specimens of *S. dealbata*, recorded the capture of a *Sphinx convolvuli*, near Victoria Park the previous week.

The meeting of 14th October was clouded by the announcement of the death of Mr. E. Cooper, the Assistant Secretary. Mr. Cooper had been a member eighteen years, the first twelve of which he spent in most active work, while up to the time of his death he had always interested himself in the proceedings of the Society. The President paid a well-deserved tribute to his memory, in a short address, and a unanimous vote of sympathy and condolence to the widow was passed and entered on the minutes.

The exhibits consisted of a bred series of *E. cervinaria* by Mr. Russell. A specimen of *P. phlaeas* var. *Schmidtii*) different from that shewn September

30th), a pupa case of *T. betulae*, together with an ichneumon and its pupa case from the same species, by Mr. Edle. Mr. Clark had in his box some very dark forms of *E. reticulata*, two *G. smaragdaria*, and a series of *L. alsus*. Mr. May had a boxful of common species from ivy blossoms, near Gravesend.

It was announced that the Pocket-box Exhibition will be held on Thursday, November 18th.—ERNEST ANDERSON, Secretary.

CLYDESDALE NATURALISTS' SOCIETY.

The annual business meeting of this society was held on Wednesday evening, 13th of October, in the society's rooms, 207 Bath Street—Nr. T. J. Henderson, President, in the chair. The Secretary read the report of the Council, on the business of the past year, and the Treasurer and Librarian read reports bearing on the financial position of the society, and the library respectfully. The reports were considered very satisfactory, and showed the society to be in an exceedingly prosperous condition. The membership during the past session has been considerably increased, while the papers read and the specimens exhibited at the various meetings have been both numerous and instructive. The excursions held during the summer months were attended by many of the members, the rambles both at the coast and in the country being most enjoyable. The Treasurer's report showed that the society had plenty of funds at its disposal, part of which is intended to be devoted to the publication of the proceedings and other objects of like nature. The library still continues to prove useful in way of supplying members with the loan of books on natural history subjects, which are otherwise difficult to procure. Messrs. James Lumsden, F.Z.S., and James M'Grouther were elected vice-presidents in room of those whose turn it was to retire, Mr. John Mackay, was re-elected to the office of Secretary, Mr. Arch. Stirling was elected librarian, and Mr. Wm. Spiers member of council. The following gentlemen were admitted ordinary members:—Mr. George Paterson, 8, Pembroke Street; Mr. Hugh M'Huel, 3, Ruthven Street, Hillhead; Mr. Alex. H. Stewart, 103, George Street, Paisley; and Mr. Fred. Wilkinson, Shaftesbury Buildings, Paisley Road West, Glasgow. Four applications for membership were also announced. Mr. Robt. Dunlop exhibited a number of very interesting geological specimens from the carboniferous formation of Scotland, including jaws of *Megolichthys pygmarus* and *Strepsodus sauroides* and teeth of *Archichthys sulcedens*, regarding which he made some instructive remarks. The next exhibit was a very important one, namely, a specimen of the Oleander hawk-moth (*Chærocampa nerii*), which had been taken on the South side of Glasgow, on the 10th September last. The specimen, which is in pretty fair condition, was exhibited by Mr. Jas. E. Wilson. It flew into a house by

means of the open window, and was found crawling on the floor, with the cat in close attendance, who seemingly could not quite make out the purpose of the strange intruder. This is believed to be the first specimen recorded as having been taken in Scotland, and as the species is extremely rare even in England, the capture is a most important and interesting one. Mr. G. G. Mackenzie exhibited some specimens of coralline and barnacles which had been found on the bottom of ship recently arrived from Java. Mr. A. A. Dalgleish showed a box containing a number of species of lepidoptera, taken lately in the district, including fine series of *D. contaminana*, *P. sordidana*, *C. radiatella*, *D. liturella*, *C. conscriptella*, *P. sodandriana*, etc. There were also in the box three very beautiful varieties of *C. russata*, a very dark specimen of *N. fulva*, taken on 7th of October (rather late for this species), two very light varieties of *M. furuncula*, and some well marked forms of *C. testata*.

A volume of the Transactions of the Chichester and West-Sussex Natural History and Microscopical Society was presented to the library, by a Corresponding member, Mr. Joseph Anderson, Jun., of Chichester, after which a vote of thanks to the various exhibitors brought a most interesting meeting to a close.—JOHN MACKAY, Hon. Sec.

THE EDITOR'S CHAT WITH HIS YOUNG FRIENDS.

Alterations in Nomenclature.

A note by Mr. Dale on 234 page forcibly illustrates the absurdity of altering well established names. We are so apt to imagine that we know better than those who went before us, that we make alterations that ought not to be made, on the strength of some discovery we imagine to be decisive. Dr. Staudinger does not appear to have been acquainted with the work of Fourcroy, and he names *Edusa* on the authority of Fabricius, quoting his work *Mantissa insectorum*, Tom. II. p. 23, published 1787. Mr. Kirby gives Fourcroy's name priority over that of Fabricius, his work being published two years earlier than that referred to by Dr. Staudinger. It now appears that both are wrong. The name *Edusa* will stand as having precedence, but the authority for the name is not that usually given, but another work by Fabricius published eleven years before that quoted by Dr. Staudinger, and nine years before Fourcroy's work. In any future catalogue the species will stand

Edusa, Fab. 1776.

Croccus, Fourcroy, 1785.

Will readers make the necessary alteration in our catalogue, p. 1.

It will be noticed that several of the alterations in the names of British species made by Staudinger, appears to be owing to his want of acquaintance with the work of Albin, published in 1720, though this work is given in his list of authorities.

The Extinct Large Copper.

A good deal of confusion obtains in the nomenclature of the *Dispar* or *Hippothoë* of British lists, and unprincipled or ignorant dealers are enabled thereby to impose on ignorant or young collectors, who want to purchase Type specimens. The point has been explained previously in the *Young Naturalist*, but as the question still crops up, and dealers still send out the wrong species, it may be as well to try again to put the matter right. In the first place the true name for the extinct British species is *DISPAR*, *Haw.* Doubleday fell into error in supposing *Dispar* to be a mere synonym for the *Hippothoë* of Linnæus. *Dispar* was called *Hippothoë* by Lewin and Donovan under the same mistake, but the true *Hippothoë* of Linnæus is known in British works as *CHRYSEIS*, W.V., and is described under that name in "Stainton's Manual." Whether the Purple-edged Copper ever occurred in this country, or whether it got into the "reputed" list through the confused nomenclature we cannot tell. The latter seems most probable. Male *Dispar* has both wings bright coppery red, with a darker border. The female has a black spot at the disc of the fore-wing, another nearer the base, and a row of black spots before the hind margin; the hind-wing is much darker, except a band of bright coppery red near the hind-margin. *Chryseis* is tinged with purple, most distinct at the hind-margin. The Alpine form (*Eurybia*) has less of the purple hue, and much more nearly resembles *Dispar*, but the latter may always be known by the underside of the hind-wing, which is a clear pale blue. *Virgaurea* is another species that I have seen in collections as a type of *Dispar*, and being larger than the others, the male might pass for *Dispar* on the upper side, but it lacks the peculiar blue of the hind-wing just named. Female *Virgaurea* have two rows of black spots between the disc and the hind margin, and the hind-wing has one, and several spots on the other portion. Those who want a foreign type should purchase the variety *Rutilus*, Wernb, but it is not nearly so common as some of the others. *Rutilus* is the Continental form of our *Dispar*, and only differs from it in being rather less, and in having the spots rather smaller, but it varies in this respect as do British *Dispar*, and the latter is too rare now to compare long series.

ADDITIONS TO THE LEPIDOPTERA OF DORSETSHIRE.

C. W. DALE.

- Dasypolia templi*, Thunb.—Taken in the Isle of Portland, by J. J. Walker, Esq.
- Tethea subtusa*, W.V.—Has been taken at Cape Castle and Glanvilles Wootton.
- Scoparia ingrattella*, Knaggs.—A coast var. of *dubitalis*.
- S. Zelleri*, W.V.—A var. of *cembrae*.
- Sericoris euphorbiana*, Curt.—A specimen taken in Portland has been recorded as *latiforciana*.
- Stigmonota orobana*, Tr.—One was taken by myself at Lyme Regis, on July 24th, 1885.
- Eupœcilia implicitana*, H.S.—Has recently been taken at Studland, by the Rev. C. Digby.
- E. pallidana*, Zell.—A few specimens of this rare species have been taken this year, at Studland.
- Xymatodoma argentimaculella*.—Larvæ of this species have been taken at Swanage, and reared.
- Depressaria hypericella*, Hub.—One was taken at Glanvilles Wootton, on the night of August 17th, 1879.
- Gelechia pictella*, Zell.—Taken on the Chesil Beach, last June.
- G. cantella*, Zell.—One taken on the trunk of a poplar at Glanvilles Wootton, last August.
- G. affinis*, Haw.—Taken at Studland, by the Rev. C. R. Digby.
- G. vilella*, Hub.—Once beaten from thatch at Glanvilles Wootton.
- G. luculella*, Hub.—Has been taken at Glanvilles Wootton.
- G. næriferella*, Zell.—Has been taken at Cape Castle, and Glanvilles Wootton.
- Anarsia genistella*, St.—Larvæ have been taken at Glanvilles Wootton this year and reared.
- Pterophorus paludum*, Zell.—This the best addition of all has been taken during the present season at Bloxworth, by the Rev. C. P. Cambridge.
- These sixteen additional species raises the number of Dorset species to 1318.

NOTES AND OBSERVATIONS.

NOMENCLATURE OF COLIAE EDUSA.—This species is described by Fabricius in his “Genera Insectorum,” bearing the date of 1776, of which I possess a copy which formely belonged to Dr. Solander. In the *Young Naturalist* list of British Lepidoptera, it is recorded thus: “Edusa, *Fab.* 1787; Croccus, *Fourcroy.* 1785.”—C. W. DALE.

THE ICELAND GULL AT HARTLEPOOL.—I shot a specimen of the Iceland Gull, here on the 18th October. It is a young bird, but in very fine plumage. I am not aware it has occurred here before.—J. CAMBRIDGE, Alliance Street, Hartlepool.

PRESERVING THE COLOURS OF FLOWERS.—Allow me through the medium of the *Young Naturalist* to ask if any of its readers can inform me how best to dry flowers so as to preserve the colours. I have tried drying them in sand as well as the usual method between sheets of paper, but I fail to get them to retain their natural colours. This is more particularly the case with flowers having thick fleshy leaves. If there is any method by which this can be done I would be glad to know.—J. T. TAYLOR, Hartlepool.

VARIETY OF THE COMMON HARE.—I do not know if it is at all a usual thing for the common hare to vary in colour, but except white hares I never saw a variety till this morning, when I observed one in a game dealer’s shop here. It was a light silver grey in colour, lighter considerably than a wild rabbit, and not unlike some of the lighter coloured silver greys that are such favourites with the “fancy” here. It had been shot in Castle Eden Dene.—JOHN E. ROBSON, Hartlepool.

THE PECULIARITIES OF OGYIA GONOSTIGMA.—Recent observations by Messrs. Anderson and Robson upon the subject of apterous females amongst Lepidoptera, bring to my recollection sundry singularities in the economy of *Orygia gonostigma*, and it may be accounted an eccentricity of Nature, that of two closely allied species, one should be so scarce in this country, and the other (*O. antiqua*) so extremely plentiful. With *O. gonostigma* I made acquaintance at its sole haunt near London, viz: Wimbledon Common, where it is confined to a small valley or depression, dotted over with dwarf oaks, hazels, and willows. So far as I am aware, there are not half-a-dozen other localities in England that have been noted up to this time. Now it is perfectly clear that in the case of both these species, the only possible way for them to be diffused is by the wanderings of the larvæ, where the females spin, there perforce they must tarry. The larvæ of *O. antiqua* is not at all particular about its food, (there have recently been some complaints as to its injur-

ing fruit-trees in several places), though partial to hawthorn and lime, it is also of a roving turn, and frequently travels from tree to tree. By rearing a good many larvæ of *O. gonostigma* I came to the conclusion that the species in its larval stage is rather *nervous*, if the word is admissible, at least any noise, or the shaking caused by the wind, soon startles them from their food. When very young, they often fall to the ground therefore, and have difficulty in getting back to the bushes before their strength is exhausted. It was unfortunate indeed for this species, that the ground close to its habitat should be taken for the rifle practice of volunteers. Another circumstance that tells against its increase is the hybernation of the larva, and it is not protected by any social or solitary web, but simply reposes on the twigs near the earth through the winter, when many die in damp seasons. The number of the eggs, however, is much greater than in *O. antiqua*, which species winters in the egg state. Probably both species in warmer climates are double-brooded; *O. gonostigma* can be made so in confinement. Perhaps some London collector can tell us whether Wimbledon Common still yields this species, I know the frequent popping on shooting days was far from favourable to the increase of some of the choice Lepidoptera that used to occur between the Common and Croombe Wood. I might add that the female *gonostigma* very dexterously denude their bodies, while egg-laying, of the thick down that clothes them, using it as a *nidus* for the eggs, though it appears odd they should do this, since the larvæ hatch out in two or three weeks.—J. R. S. Clifford, Gravesend.

A PLAGUE OF FLIES.—Hearing reports of “a plague of flies,” so-called, which were much annoying the rustics of some of North Kent villages, by entering the eyes, noses, and mouths of persons working in the open air, I went to see, and found, as I suspected, a late migration of Aphides was going on. The examples I took chiefly belonged to a large black species, and they were travelling westward in goodly numbers. It was thought by the late Francis Walker, that these Aphis journeys were seldom for any distance, but I had proof in a summer migration last year, that a host of individuals started from the fields of Essex, crossed a line of marsh, then the Thames, and the town of Gravesend and its adjacent gardens, to spread themselves over the hop grounds. Many died *en route*, doubtless, those, however, that reached their destination must have travelled three or four miles. No doubt this October exodus was prompted by the long continued dry weather, and the fact that after a dry’s rain there were still Aphides journeying suggested that these had come some distance.

Many journals have remarked, that the common housefly has been un-

usually plentiful in 1886, owing to the comparative scarcity of swallows and wasps. I believe it was the case with the swallows, that on their arrival here they suffered much from lack of food, and many may have died, as has been suggested. Wasps in North Kent have been observable in about the customary numbers, no doubt they frequently kill and eat other insects, but I have not noticed them to single out the housefly specially. It will probably be found that a dry, moderately hot summer is favourable to the increase of the house-fly.—J. R. S. Clifford, Gravesend.

HOP-DOG OR HOP-CAT?—Newman states the larva of *Orgyia pudibunda* is styled the "hop-dog" in many places, but about Gravesend it appears to bear the name of "hop-cat." Its coat of hairs may quite as much entitle it to the feline as to the canine designation, perhaps more so. Though named from the hop, it is more oftener found on other plants and trees, even in the hop districts, is partial to high climbing, but after repeated falls through the summer winds, it then becomes content to dwell amongst the humbler and shady bushes.—J. R. S. CLIFFORD, Gravesend.

THE STORMY PETREL AT HARTLEPOOL.—My son saw four or five of these birds on the wing a few days ago, but failed in shooting one. On Thursday a specimen was captured alive by a fishing boat, and is now in the possession of Mr. J. A. Mann, Taxidermist.—JOHN E. ROBSON, Hartlepool.

THE KING FISH AT HARTLEPOOL.—A fine specimen of a fish I make out to be the King Fish (*Lampris guttatus*) has been taken here. It was found on 30th October, at Black Hall rocks, some four miles north of the town, washed up by the tide but still alive, and was brought to the fish quay, where I had the opportunity of examining it. It measured 2 feet 8 inches from mouth to tail, and nearly as much from back fin to ventral fin. In colour it was dark silvery grey, with a number of oval spots of lighter colour. Where the skin was slightly rubbed it was silvery, but where much abraided it was a deep salmon colour. All the fins as well as the tail were a most brilliant orange-red, and altogether it was the most beautiful fish I ever saw. It was bought by Mr. Thorp, a local fishmonger, and sent, I understand, to York, to be offered to the Museum there.—JOHN E. ROBSON, Hartlepool.

EXCHANGE.

DESIDERATA—Fine well-set specimens of *Atalanta*, *Cardui*, *Cardamines*, *Corydon*, *Adonis*, *Egeria*, *Edusa*, and other common Southern species; also *Paniscus*, and the *Theclæ* (with the exception of *Rubi*). Will make a good return.—JOHN MACKAY, 78, Gloucester Street, Kingston, Glasgow.

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OUR BRITISH ORTHOPTERA.

By C. W. DALE.

THIS is rather a singular order, for out of 54 species recorded as British, only 36 can be considered truly as such. With four exceptions, all the species are of large size.

FAMILY 1, FORFICULIDÆ.

1. *Labidura gigantea*, Linn. This large species of earwig has hitherto been found only in the vicinity of Christchurch, Hampshire, where numerous examples were secured by the Rev. W. Bingley, on the 7th July, 1808. The largest he could procure was nearly fifteen lines in length, exclusive of the antennæ, which measured rather more than half-an-inch. A friend of Mr. Bingley's (Mr. Sloman) sought for them afterwards in the same place—Mount Misery—and found a large number concealed under large stones on the sands, rather below high water mark. When approached they turn up the abdomen, bending the extremity over the head, which they defend by means of their enormous forceps. It came to be reckoned amongst the extinct British species, its native origin being actually questioned by the Rev. W. Kirby in his "Introduction to Entomology," until 1874, when a specimen was taken, at Bournemouth, by E. Saunders, Esq. Since then, a few specimens have been taken by Mr. Kemp Welch, of Poole.
2. *Labia minor*, Linn. Little Earwig. Flies in the sunshine, and is very abundant in the spring.
3. *Forficula auricularia*, Linn. Common Earwig.
 - Var. *forcipata*, Steph. Forceps very long and slightly incurved.
 - Var. *boreali*, Steph. Forceps slightly elongated, the two sides forming somewhat of an elliptic figure.
 - Var. *media*, March. Small; forceps slightly elongated and very pale.
4. *Apterygida albipennis*, Mégerl.
 - Forficula pubescens*, Géne. ?

Forficula decipiens, Géne. ? Mr. J. F. Stephens mentions that the only examples of this very distinct species were taken at Ashford, Kent, by J. G. Westwood, Esq. It occurs sparingly at Glanvilles Wootton, but is very common amongst reeds on the sea coast.

5. *Anisolabis maritima*, Bcnelli.

Forficula mæsta, Géne. Numerous specimens of this species of earwig were taken at South Shields, under stones on the sands, by T. J. Bold, Esq., in September, 1856.

FAMILY 2, BLATTIDÆ.

6. *Ectobia lapponica*, Fab. Rather a scarce species, occurring in the New Forest.
7. *E. ericetorum*, Wesm. Common on sandy heaths and coast sand hills.
8. *E. livida*, Fab. Not a common species, but widely distributed in the South of England.
9. *E. germanica*, Linn. An imported species, occurring in dwelling-houses and warehouses in and near London, Portsmouth, Plymouth, Liverpool, &c., and not uncommonly on board merchant vessels.
10. *Blatta orientalis*, Linn. Common Cockroach. Originally an imported species, but now fairly established in many houses throughout the country, occurring in the utmost profusion.
11. *B. Americana*, Linn. An imported species, being found in warehouses, and on board merchant vessels in the London docks, Portsmouth, Plymouth, Liverpool, &c.
13. *Blaberus giganteus*, Linn. An imported species found occasionally on board of merchant vessels in London docks, Liverpool, &c.

FAMILY 3, ACHETIDÆ.

14. *Gryllus gryllotalpa*, Linn. Lé Grillon in French.
Gryllotalpa vulgaris, Latr. Mole-cricket. This extraordinary creature frequents fields, meadows, boggy places, the rich mould of garden grounds, &c., in the South of England, but can by no means be considered common.
15. *Acheta domestica*, Linn. House Cricket.
16. *A. campestris*, Linn. Field Cricket. Widely distributed in the South of England, but rarely seen on account of its retiring habits.
16. *Nemobius sylvestris*, Fab. Wood Cricket. Not rare amongst dead leaves in the New Forest, Hampshire, where it was first discovered by my father, in July, 1820.
18. *Cecanthus italicus*, Fab. An imperfect example of this species was taken by Mr. Haworth, many years ago, near Halvergate, in Norfolk.

FAMILY 4, ACRIDIDÆ.

19. *Odontura punctatissima*, Bose. An apterous species found on trees in the autumn.
20. *Meconema varia*, Fab. Common on trees in the autumn.
21. *Xiphidium dorsale*, Latr. Common at Freshwater, in the Isle of Wight, and other places in the South of England, also in Yorkshire.
22. *X. fuscum*, Fab. This has been erroneously given as British. It may be known by its complete second wings.
23. *Phaneroptera falcata*, Scop. A single specimen of this conspicuous and beautiful species was captured by P. B. Mason, Esq., near the little fishing village of Porthgwarra, on the West coast of Cornwall, in September, 1881.
24. *Phasgonura viridissima*, Linn. Green Locust. The females of this family differ from those of the true locust, by having a sword at the extremity of the abdomen.
25. *Decticus verrucivorus*, Linn. A rare and very local species taken near Rochester, in Kent, by Professor Henslowe, in August, 1825, and by my father in the New Forest, on August 3rd, 1844.
26. *D. Bingleii*, Dale. A very rare species figured by Curtis in his "British Entomology." My female was taken by the side of a barley field, at Christchurch, Hampshire, on July 30th, 1818, and a male at the same place the following August.
27. *D. grisea*, Fab. Common on the coast amongst *Ononis* or rest harrow.
28. *Platycteis brevipennis*, Charp.
Micropterea Raselii, Steph. Of this species Mr. J. F. Stephen's writes, "This species appear to be very rare in this country. I have hitherto seen, so far as I remember, two examples only, which are in my own collection, and were found in the vicinity of the Metropolis, in the autumn, I believe at Hampstead." There is also a specimen in the collection of P. B. Mason, Esq., unfortunately with no ticket of locality.
29. *P. brachyptera*, Linn. Not rare on heaths.
30. *Acrida cinerea*, Linn. Not a rare species.
Thamnotrizon apterum, Charp.
31. *Myremecophila acervorum*, Panz. Included by the Rev. F. O. Morris, in his "Catalogue of British Insects," but, I believe, erroneously.

FAMILY 5. LOCUSTIDÆ.

32. *Pezotettix pedestris*, Linn. Not rare in the South of England. Adult specimens may be known from those of the next genus by the shortness of both the elytra and wings.

33. *Stenobothris dorsatus*, Zett.
montanus, Steph.
parallelus, Steph.
pratorem, Fieb. Of this species the elytra are long but narrow, and the wings short.
34. *S. elegans*, Charp.
tricarinatus, Steph. Rather a scarce species found in marshy situations.
35. *S. lineatus*, Panz. Not a common species.
36. *viridulus*, Linn. Common Grasshopper.
hæmorrhoidalis, Charp.
stigmaticus, Ramb.
rubicunda, Steph.
aprica, Steph.
37. *mollis*, Charp. With pale elytra. Scarce.
38. *biguttulus*, Linn. Common Grasshopper.
venosus, Steph.
39. *bicolor*, Charp. With dusky elytra. Scarce.
rhomboideus, Steph. Schæff.
40. *rufipes*, Zett. Moderately common.
varipes, Steph.
apricarius, Linn.
41. *miniatus*, Charp.
rubicundus, Germ. Of this species Mr. J. F. Stephens wrote "I obtained this insect from Marshamian collection, and knows not its locality."
42. *Gomphocerus biguttatus*, Charp. A common species.
calidoniensis, Steph.
apricarius, Steph.
ericetarius, Steph.
elegans, Steph.
43. *G. rufus*, Linn. A scarce species, found in the New Forest, and formerly in abundance at Battersea.
44. *G. sibiricus*, Linn. Of this species Mr. J. F. Stephens writes "This singular insect is in Mr. Hope's rich collection: taken on the hills near Netley."
45. *Stethophyma grossum*, Linn. A local species, occurring at Whittlesea-mere and on the Dorset heaths.
46. *Locusta tartarica*, Linn. Inserted in the British lists without authority.
47. *Pachytylus migratorius*, Linn. This is the locust most frequently met in the West of England. "About the beginning of June, in the year

1601, a piece of ground, of about 200 acres, was suddenly covered, as if the same had fallen in a shower out of the air, with a kind of caterpillar or green worm, having many legs, and bare without hair. They were found in such abundance that a man could not tread on the ground without crushing twenty or thirty of them: being opened, there was nothing found within them but grass. The place was on a hill in the parish of Maen-clochog. After they had continued three weeks, there resorted thither an infinite number of sea-mews and crows, which in a few days consumed them all; the swine also fed upon these worms eagerly, and became very fat. Swarms of locusts appeared on the British coasts in the year 1693. They were first seen in Pembrokeshire about the 20th October. In North Wales, two vast swarms of them were seen in the air."—Extracted from the Philosophical Transactions, 1693-4. In 1742, at the end of August, great damage was done to the pastures, particularly about Bristol, by swarms of grasshoppers. In 1748 also, locusts were observed here in considerable numbers, but, providentially, they soon perished without propagating. These were evidently stragglers from the vast swarms, which in the preceding year did such infinite damage in Wallachia, Moldavia, Transylvania, Hungary, and Poland. In 1858, a great number of locusts were found in September, amongst corn fields, in most of the Shetland Islands, as likewise in the bare and isolated Skerry Islands. Numbers were also seen on the North-east coast of Scotland, and also in England, one being taken here on the 1st September.

48. *P. cinerascens*, Fab.

Christii, Curt. This locust has been most frequently taken in the East of England.

49. *P. stridulus*, Linn. Stewart gives this as British, but probably erroneously.

50. *Edipoda cœrulescens*, Linn. This is also introduced by Stewart as indigenous, but evidently without authority.

51. *Acrydium peregrinum*, Cliv. A considerable number of this locust were taken in Cornwall, in October, 1870: some were captured at Falmouth, and about thirty in or near Plymouth.

52. *Tettix subulata*, Linn. A common species.

pallescens, Zett.

marginatum, Zett.

humeralis, Zett.

dorsata, Zett.

bimaculatum, Zett.

53. *T. Schrankii*, Fieb. A very small species, taken by Dr. Buchanan White, in Rosshire, Invernesshire, and Kickudbright, in 1870. One was also taken by myself at Deal, in October, 1879.
54. *T. bipunctata*, Linn. A Common species.
- pinnula*, Curt.
laterale, Zett.
ephippium, Zett.
binotatum, Zett.
crisatum, Zett.
vittatum, Zett.
zonatum, Zett.
obscurum, Zett.
oehreum, Zett.
hieroglyphicum, Zett.
scriptum, Zett.
variegatum, Zett.
nigricans, Sour.

REPUTED BRITISH SPECIES:—*Ecanthus italicus*, *Xiphidium fuscum*, *Platycleis brevipennis*, *Myrmecophila acervorum*, *Stenobothris miniatus*, *Gomphocerus sibiricus*, *Locusta tartarica*, *Pachytylus stridulus*, and *Edipoda cœrulesclus*.—9.

CASUAL VISITORS.—*Phaneroptera falcata*, *Pachytylus migratorius*, *P. ciuerascins*, and *Acrydium peregrinum*.—4.

IMPORTED SPECIES.—*Ectobia germanica*, *Blatta orientalis*, *B. americana*, *B. maderæ*, and *Blaberus giganteus*.—5.

TRUE BRITONS.—*Labidura gigantea*, *Labia minor*, *Forficula auricularia*, *Apterygida albipennis*, *Anisolabris maritima*, *Ectobia lapponica*, *E. ericetorum*, *E. livida*, *Gryllus gryllotalpa*, *Acheta domestica*, *A. campestris*, *Nemeobius sylvestris*, *Edontura punctatissima*, *Meconema varia*, *Xiphidium dorsale*, *Phasgonura viridissima*, *Decticus verrucivorus*, *D. Binglei*, *D. grisea*, *Platycleis brachyptera*, *Acrida cinerea*, *Peryotettis pedestris*, *Stenobothrus dorsatus*, *S. elegans*, *S. lineatus*, *S. viridulus*, *S. mollis*, *S. biguttulus*, *S. bicolor*, *S. rufipes*, *Gomphocerus biguttatus*, *G. rufus*, *Stethophyma grossum*, *Tettix subulata*, *T. Schrankii*, and *T. bipuncta*.—36.

Writing of the genus *Tettix*, of Charp; *Acrydium*, of Fabricius; *Bulla* of Linnæus; Sowerby observes "This genus is more numerous in species than entomologists at present seem to be aware of. Most of them are regarded merely as varieties of *subulatum* and *bipunctatum*, but they are distinguished from each other, not only by the difference of colour, but likewise of shape.

The genus might be divided into two; one with a straight scutellum, the other with an arched one." The only other genus about which there is any doubt as to the number of species in *Stenobothrus*. Sowerby also observes "We cannot here help expressing our opinion, that the name *Locusta* ought to be given to that genus which contains the insect, which is called by way of eminence the Locust, and *Gryllus* to that which contains the Cricket." Le Grillon is the French for a mole Cricket. The name *Tettigonia* was given by De Geer, in 1764, to a genus of the Homoptera, but Linnæus included under the name the Green Locust—*viridissima*. The generic names of *Platycleor* and *Decticus* may be sunk, and the species included in *Acrida*. The generic names, *Apterygida*, *Anisolabeis*, and *Pachytylus* may also be sunk.

NOTES ON LEPIDOPTERA.

By B. LOCKYER.

(Continued from page 221.)

C. FULVATA.—Flying near dog rose, in Bishop's Wood, Hampstead, and New Forest. July.

C. PYRALIATA.—Beaten out of bushes by day, Bishop's Wood, Hampstead.

PELURGA COMITATA.—At light, and flying among *Chenopodium* in July and August. The larva is very abundant in September on *Chenopodium*, by night. Waste places and fields near North London.

EUBOLIA MENSURARIA.—By beating bushes in the day-time, in July and August. Not common. Bishop's Wood and New Forest (woods only.)

E. PALUMBARIA.—Startled out of heather by day. Heaths in New Forest in July and August. Rather common.

E. LINEOLATA.—Disturbed from amongst rest harrow (*Ononis*) and Bedstraw, on sandhills, by day. Yarmouth. August.

ANAITIS PLAGIATA.—Common at rest, on Bishop's Fence, near West Wickham Wood. May and June.

TANAGRA CHEROPHYLLATA.—Disturbed from weeds in waste places and woods by day. Common at Kensal Green near the railway, rare in Park Hill inclosure, Lyndhurst. July.

PLATYPTERYX HAMULA. At rest on fence near Shirley, Surrey. May. Larva once beaten from oak, Southwood, Highgate.

P. UNGUICULA.—Woods near Lyndhurst, New Forest. May.

DICRANURA BIFIDA.—On palings and lamps at Hampstead. May. The larvæ occurred on sallow in Bishop's Wood, Hampstead.

D. FURCULA.—Larvæ on sallow, Park Hill inclosure, New Forest. August, 1874.

D. VINULA.—Once taken at rest on the iron rails of the Cemetery, near Wood Green, Middlesex. June. Larvæ not rare at Ilfracombe and Lynton, North Devon (1865); Whitby, Yorkshire (1866); and one or two in plantations near Lyndhurst (1874).

STAUROPOUS FAGI.—Larvæ rare in the New Forest, on beech, sallow, and oak.

PETASIA CASSINEA.—Larvæ rare on oak in the New Forest.

NOTODONTA CAMELINA.—Flying at dusk in woods; the larvæ common in the autumn on hawthorn, oak, birch, &c. Bishop's Wood, Highgate Woods, and New Forest.

N. DICTÆOIDES.—Larvæ rare, near Lyndhurst.

N. DROMEDARIUS.—Do., and at Bishop's Wood.

N. ZICZAC.—Larvæ not very rare on sallow and poplar, Bishop's Wood, Whitby (Yorkshire), and New Forest.

N. TREPIDA.—Imago rare, at rest on oak; larva rare on same tree. Ballards, Croydon and Denny Wood, New Forest. May. Imago *teste*, G. Tate.

N. CHAONIA.—At rest on oak in May and June; larva in July and August. Rare. New Forest.

N. DODONÆA.—Commoner than the preceding. New Forest.

DILOBA CÆRULEOCEPHALA.—Larvæ used to be common near Southgate Station, and at Hadley Wood (near Barnet), Middlesex and at Highbeeche, Epping.

THYATIRA DERASA.—At sugar in June and July, also on palings. Bishop's Wood, Hampstead, and Park Ground inclosure, Lyndhurst. The larvæ rare near Southwood, Highgate.

T. BATIS.—At sugar, bramble bloom, and on palings. End of May to August. Bishop's Wood, Southwood, and New Forest.

CYMATOPHORA DUPLARIS.—Rare at sugar. Bishop's Wood. July.

C. DILUTA.—At sugar. Not uncommon. Darent, Bishop's Wood, Southwood, and Park Ground inclosure, Lyndhurst. August and September.

C. RIDENS.—Saw one or two taken at rest on trunks of trees, and old fences overgrown with lichen, near Park Ground inclosure. March and April. Larvæ not rare in different parts of the Forest.

BRYOPHILA GLANDIFERA.—On stone walls at Gorlestone, Suffolk. Aug:

B. PERLA. Do., and at Highgate and Hampstead.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

November 3, 1886.—ROBERT M'LACHLAN, Esq., F.R.S., President in the chair.

The following gentlemen were elected Fellows, *viz.*, Mr. Peter Cameron, of Sale, Cheshire; Mr. F. Archer, of Crosby, Liverpool; Mr. H. J. S. Pryer, of Yokohama, Japan; Mr. H. Norris, of St. Ives, Hunts; Mr. N. P. Fenwick, of Surbiton Hill; Mr. John Brown, of Cambridge; Mr. J. P. Tutt, of Westcombe Park, Blackheath; and Mr. A. P. Green, of Colombo, Ceylon.

Mr. E. B. Poulton exhibited a mass of minute crystals of formate of lead, caused by the action of the secretion of the larva of *Dicranura vinula* upon suboxide of lead. He stated that a single drop of the secretion had produced the crystals which were exhibited; and he called attention to the excessively high percentage of formic acid which must be present in the secretion, and to the pain, and probable danger, which would result from being struck in the eye by the fluid which the larva had the power of ejecting to a considerable distance. A discussion ensued, in which Messrs. White, Kirby, Slater and others took part.

Mr. S. Stevens exhibited a specimen of *Laphygma exigua*, recently captured by Mr. Rogers in the Isle of Wight.

Mr. W. F. Kirby exhibited, and read notes on, a specimen of *Perilampus maurus*, Walk., recently bred by Mr. Walter de Rothschild from *Antheræa tirrhea*, Cram., one of the rarer South African Saturnidæ.

Mr. T. W. Hall exhibited a number of specimens of *Xanthia fulvago* (*cerago*), somewhat remarkable in their variation, and showing a nicely graduated series, extending from the pale variety *flavescens* of Esper, to an almost melanic form.

Mr. Boyd exhibited, and made remarks on, the larva of a species of *Ornithoptera* from New Guinea.

Mr. H. Goss exhibited a series of *Bankia argentula* collected by him in Cambridgeshire, in June last; and also, for comparison, a series of specimens of the same species taken at Killarney in June, 1877. It appeared that the Irish form of the species was larger and more brightly coloured than the English form.

Mr. Eland Shaw exhibited a female specimen of *Dectitus verrucivorus* (Linn.), taken in July last, at St. Margaret's Bay, Kent.

Mr. Waterhouse recorded the recent capture of *Deiopeia pulchella* at Ramsgate, by Mr. Buckmaster; and the capture of *Anosia plexippus* at Gibraltar was also announced.

Mr. J. W. Slater read a paper on "The relations of insects to flowers," in which he stated that many flowers which gave off agreeable odours appeared not so attractive to insects as some other less fragrant species; and he stated that Petunias, according to his observations, were comparatively neglected by bees, butterflies and Diptera. Mr. Distant, Mr. Stainton, Mr. Weir, Mr. Stevens and the President took part in the discussion which ensued, and stated that in their experience Petunias were often most attractive to insects. Mr. Stainton referred to the capture by himself, of sixteen specimens of *Sphinx convolvuli* at the flowers of Petunias, in one evening in 1846.

Jonkeer May, the Dutch Consul-General, asked whether the reported occurrence of the Hessian Fly (*Cecidomyia destructor*) in England has been confirmed. In reply Mr. M'Lachlan stated he believed that several examples of an insect thought to be the Hessian Fly had been bred in this country, but that everything depended upon correct specific determination in such an obscure and difficult genus as *Cecidomyia*.—H. Goss, *Secretary*.

HAGGERSTON ENTOMOLOGICAL SOCIETY.

The meeting of October 21st, was fairly well attended, though there were not many exhibits. Mr. Cripps brought some *Amara convexiuscula* and *Anchomenus oblongus*. Mr. Eedle shewed *E. octomaculalis*, *A. aglaia*, *S. cynipiformis* and *G. cerella*. Mr. Pearson had a series of *Thecla rubi*, upon which species he introduced a discussion.

The following meeting was devoted to discussing the life history of *Zephyrus quercus*, the economy of this handsome and well distributed little species, affording good scope for a very interesting evening. It was stated that this species, which until recently, was included with all the other "hair streaks," in the genus *Thecla*, is now, in company with *Betula*, transposed to the genus *Zephyrus* on the authority of Dalman, followed by Kirby, and more recently by Robson, in the list now being issued; the grounds of their division being the thicker antennæ, and more especially the difference in the neuration of the anterior wings. The ova are laid in the summer, but probably do not hatch until the following spring, though this part of their economy does not appear to be well established among entomologists. The larvæ which are full fed in May and beginning of June, are reddish-brown, with oblique stripes on the back, and a brownish black dorsal line, although some authors have mentioned Sallow as well as Oak to be their food plant, it was thought they must be in error, as general experience agreed to its being exclusively an oak feeder. When full fed they are easily beaten, and are familiarly known as "Soles" among many entomologists, from their flat appearance and supposed resemblance to that fish. The pupa, which has

been found underground, a very unusual position for a butterfly pupa, is more frequently attached to a twig or stalk, and the perfect insect emerges in about a fortnight or three weeks. It was further mentioned that when freshly emerged this species had a very beautiful appearance, in fact it was almost like a small Purple Emperor. It was of very sportive habits, and very gregarious, large numbers being frequently observed sporting round some particular tree, mostly an oak, but sometimes an ash or birch, and it was thought very probable that it was owing to one of the older entomologists observing such an assemblage round a willow, that led to that food plant being quoted. The flight was mostly high, and one means of attracting the insects lower, was by throwing small stones among them, for so pugnacious are they, that they will frequently follow the stones down to within striking distance of the entomologist. Any other species of butterfly approaching their head-quarters is invariably attacked and driven away, even the lordly *Iris* itself being compelled to withdraw before the attacks of its nimble little antagonists.

On November 11th, Mr. Clark exhibited two beautiful forms of *Pachnobia hyperborea*, the one being very much streaked with black, and the other being a very light specimen.

The following Thursday was the occasion of the annual Pocket-box Exhibition, which was very well attended by members, and the visitors also mustered in good force. The exhibits, which were ranged on a long table down the centre of the room, afforded much interest; and the friendly meeting of brother entomologists from all parts of London, some of whom had not met since the previous exhibition, altogether tended to render the evening a very cheerful and successful one. Each year, however, the absence of one or two well-known faces is marked at these gatherings, and on this occasion the presence of the late Assistant Secretary (Mr. E. Cooper) was greatly missed by his old comrades.

The two orders Coleoptera and Lepidoptera were the only ones represented, and nothing very new was shown of either. The presence of *Geometra smaragdaria* and *A. alni* in some numbers, has of late been of frequent occurrence, and therefore excited little comment, but the magnificent lot of *Plusia orichalcea* and the bred *Nascia cilialis*, exhibited by Mr. T. Cooke, were certainly something rather out of the way; and a very perfect specimen of the rare *Deiopeia pulchella* captured at rest, on a piece of seaweed, at St. Margaret's Bay, by Mr. Hanson of Plumstead, gave rise to much admiration.

Among the exhibits by members, may be mentioned some very fine large specimens of *C. caja*, bred from ova laid by a very dark melanic variety, the specimens however, only had the normal markings with very little variations,

they were exhibited by Mr. J. A. Clark, whose case also contained some fine *Z. æsculi*, captured in Hackney, suffused forms of the female *O. potatoaria*, a series of *E. autumnaria*, bred from ova and two of the same species taken by Mr. Davis of Dover; *S. fagi*, bred from ova obtained in Epping Forest, a very fine dark *C. caja*, from a larva taken on Hackney marshes, and also a most extraordinary specimen of the female *S. carpini*, having the whole of the wings of a smoky black colour, in which the normal markings were all plainly observed, the specimen was captured at Tunbridge Wells; many other rare and interesting species were in this box. Mr. T. Cooke, exhibited 24 *A. alni*, bred from eggs, at Marlow; 18 *P. orichalcea*, from larvæ, at Wicken Fen; also bred *N. ciliaris*, *D. irregularis*, *E. lutulenta*, *T. gothica*, var. *gothicina*; a specimen of *P. phlæas*, having the black spots very minute, and another specimen suffused all over with brown. *S. alveolus*, var. *A. cinerea*, and many others.

Mr. Harper had a large case, containing fine examples of the hawk moths and clearwings, also dark and light varieties of *M. hastata*; one *C. rotundaria*, *M. alternata*, *T. craccæ*, and beautiful vars. of *C. russata*, and *E. angularia*. The President (Mr. Hockett), showed long rows of bred *A. prunaria* and *B. rhomboidaria*, shewing many curious forms, also a series of bred *E. autumnaria* and vars. of *A. grossulariata*. Mr. Jobson's box contained a row of *G. smaragdaria*, four *N. ciliaris*, *E. stachydalis*, *E. sexalata*, etc. Mr. Gurney sent up some fine *L. argiolus* of this spring, and Mr. Pearson shewed some very carefully prepared life histories of 12 species, including *V. atalanta*, *V. io*, *S. tipuliformis*, *N. xanthographa*, *N. triangulum*, *C. villica*, etc. Mr. Lane's boxful of *Z. betulæ*, proved that the species is not yet extinct in Epping Forest, and the specimen of *V. C-album* captured by Mr. McDonald, in the west of England was also interesting. Some more *G. smaragdaria* were observed in Mr. J. A. Cooper's box, which also contained *E. venustula*, and a very beautiful var. of *V. urticæ*. Mr. Barker contributed a suffused form of *E. fasciaria*, a male *N. russula* having the hind wings perfectly pure, and a female *A. fuliginosa* with spotted posterior wings, being a sort of intermediate form between the scotch and southern forms. Dr. Sequeira added a specimen of *V. io* captured that day, flying in the heart of Spitalfields, and he also shewed a very extraordinary pale lemon form of *C. pamphilus*. Mr. Levett's case, among other interesting species contained a fine *A. atropos*, captured last May at Greenwich, also *A. leporina*, *C. taminata*, *G. papilionaria*, bred; *E. medea*, *E. subnotata*, and a rich looking *V. maculata*. The exhibits of Coleoptera were particularly good. Mr. Lewcock as usual leading the way with a magnificent collection of the genus *Donacia*, the result of many ex-

peditions and hours of wading and searching in the damp places where these species "most do congregate," also *Chrysomela*, *Cryptocephalus*, *Aphodius*, *Elateridæ* and *Teliphoridæ*; a series of *Gyrinus urinator*, from Bath; *Xestobium tessellatum* from Sunbury, and *Gibbium scotias*. Mr. Pearson's small box included several species of *Coccinellidæ*, *Rhynchites pubescens*, *Clytus mysticus*, *Mezium affine*, &c. Mr. Cripps exhibited two cases, the one containing *Bembidium concinnum*, and *B. lunatum* (from Rainham), *Sphodrus leucophthalmus*, *Anchomenus atratus*, &c.; and the other a miscellaneous assortment of *Bembidii*, *Aphodii*, *Carabus granulatus*, *Cleonus nebulosus*, *Brachinus crepitans*, &c.

As usual the visitors contributed much towards the objects exhibited. Mr. Hanson's *Pulchella* has already been mentioned, and in the same box were var. of *A. caja* and a bleached *S. janira*. Mr. Southey exhibited on behalf of Mr. Gee, the very beautiful yellow variety of *A. grossulariata* shewn last year, together with another similar specimen captured in the same garden, and also boxes of his own collecting at Highgate, containing a very large number of *Micros*, and *A. Prodrumaria*, *N. ziczac*, black *A. betularia*, &c. Mr. Williams shewed *P. hyperborea*, *P. orichalcea*, *M. arundinis*, *M. flammea*, *N. brevilinea*, &c. Mr. Hillman's small exhibit of the life histories of *T. janthina* and *P. vitalbata*, was very perfect. Varieties of *L. alsus* and *F. atomaria*, together with black *X. polyodon* and *N. senex*, captured by himself at Keswick, were shewn by Mr. Goldthwaite. Mr. Mera had a beautiful series of *F. conspicuata* and *N. viridata*. Mr. Adkin brought a series each of *P. plumigera* and *L. sexalata*. Mr. Riches was well represented with *X. scolopacina* and *S. certata*. Mr. Bryant with a microscope exhibited interesting slides during the evening. The tusks of a sacred white elephant, exhibited by Mr. Phipor, also commanded much attention.—E. ANDERSON, Secretary.

NOTES ON THE LEPIDOPTERA OF "UNST."

By C. S. GREGSON.

I have again been favoured by Mr. Curzon, with an opportunity of examining the whole of the captures made by him during a six months sojourn (7th May to 11th November, 1886), at Unst, the most northern of the Shetland Isles.

On looking over the whole of the species captured, I was somewhat astonished to find that some species which Mr. Curzon found in plenty, during his

four months sojourn in "Unst," in the summer of 1884, were not seen at all this summer, or if seen were in greatly reduced numbers.

Thus *Hepialus humuli* and its varieties were *smaller* in size and few in number, though the variations are well pronounced in his captured specimens, but wanting in the brighter reds, the markings being browner ochreous than in 1884, the species was not abundant—either type or variety in 1886. The specimens taken have a decided tendency to dull smoky under wings, males with ochreous buff upper wings, often entirely wanting in depth of red markings, the white males have a tinge of lemon yellow upon them, but are almost without the bright reddish-yellow cilia, so conspicuous in some of the 1884 specimens.

H. velleda.—Abundant in 1884, only two specimens seen in 1886, these are beautifully and distinctly marked, but small.

Graminis.—Small, inclined to var. *Hibernica*, only three specimens obtained.

Furva.—Bred from larva found under stones and clods, on the cop fences, fine and dark.

Festiva (varieties).—As variable in size as it is in colour. Size from one inch two lines, to one inch five lines. Colour from deep dull ashey greys, to dark rich red browns. Some specimens with rhomboidal marks (dark) between the well pronounced stigmata, and distinctly banded, others without a marking of any kind observable upon the dark rich brown wings, some specimens reminding us of *Brunnea* and others of *Bella*.

Exulis.—Passé but large and variable in colouration, from light suffused yellowish-drabs, to rich cold browns, with broad band, edged with yellow ochre, stigmata obsolete, to distinctly outlined with yellow and white.

Oculea.—Large variety *I. niger*, Haw. Scarce.

Abjecta.—Dull drab without markings.

Montanata.—Abundant in 1884, only three species seen in 1886.

Immanata.—Only one specimen seen in 1884, taken freely in 1886. Variable in size and markings, from dark rich brown, to light marmorate specimens.

Munitata.—Scarce, but all fuscate specimens.

Porphyrea.—Dull ashey specimens, few seen or taken.

Glariosa.—Two intermediate specimens, variety *intermedia* of my collection, all the rest of the grand series are as dark as *Erebus*, variety *Hebriacoides* of my cabinet.

Em. Albutata and var. *Thule* (Weir).—Finer than in 1884, and the variety retaining the full size of the typical specimens. The series running from rather white strong banded forms to dull dark cinereous fuscate specimens, without perceptible markings, not common this season.

Eup. Curzoni.—This species had special attention, the result being the capture of a most magnificent series of beautiful specimens, taken as they emerged from the pupa, they are quite equal to bred ones. Some are broad banded, some narrowly strigate, but all are bright silvery steel greys.

Eup. Nanata.—It is now conclusively shewn by the close observations of Mr. Curzon and Mr. Salvage that no specimens of this species can be found on the Isle of Unst, in fact *Nanata* does *not* occur so far north as any of the Shetland Isles.

Musculosa.—Bright silvery but small specimens. The hind large blotch often reduced to a small dark patch. Var. *Splendanae* of my collection.

Gelechia tetragonella.—N.S. taken May 20th, as per note-book, amongst stunted heather.

P. crucifera.—A perfect pest in 1884, not seen in 1886.

Cecziata.—Abundant in 1884, only one specimen seen in 1886.

Dalella.—Common in gardens, feeding on the underside of cabbage leaves, eating round holes in the leaf, and laying along the ribs in its web.

The disputed *Agrotis Cursoria Tritici*, searched anxiously and persistently for where it occurred so freely in 1884, could not be found in 1886, either as larva or imago.

EXCHANGE.

Exchange now-a-days is funny. Casting one's eye down the column of an exchange list, we see many things that make us smile. We will see for instance one gentleman who will sacrifice such insects as *L. marginata*, *Testata*, *Polyodon*, *Plecta*, and *Atalanta*, and all he requires are a few *Scoliaeformis*, *Expallidata*, and *Coronata*. Another gentleman offers *Orbona*, *Oleracea*, *Brassicæ*, all bred, and *Polyodon*, and informs his intended correspondents that his wants are numerous. Now, this generous collector must have wasted his valuable time in setting a tremendous supply of these rarities or he finds it difficult to dispose of insects that any incipient of half-a-years experience can take in his own garden, be it only a window-box; whichever it may be he thrusts his advertisement before the Entomological public no less than seven or eight times in succession. Another misguided individual three or four times informs Entomologists that he might be induced to part with *V. urticae*, *Io*, *Brumata*, *Didymata*, *Grosulariate*, *Lubricipeda*, *Menthastri*, and *Typica*, for his numerous wants. One gentleman goes as far as to offer *P. brassicæ*. Surely there ought to be some line drawn. It is an insult to the science to

offer any one such insects, unless there is some peculiar local variety on which the advertiser is quite silent. I do not know any one who prefers to be a "ready set" collector. And is it possible, for any one who is able to give an exchange for these insects, to be without them. And what about another class of exchangers, of which this a sample, he offers *Salicis* and *Badiata* and a few better things, but wants *Ulvæ*, *Brevilinea*, and *Neurica*, which he stipulates must be blackpinned and well set. We can dismiss this class at once by the appellation "mere collector," and only use it as a contrast to one benovolent old Entomologist, who year after year catches and sets a number of specimens of *Flavocincta*, and distributes them to any who want them, expecting and getting no return; and I believe it is difficult to find a cabinet in the kingdom that has not had some of his specimens in it. There are certain insects, which are not supposed to be rare, but yet are by no means common, but for some reason or other are never offered in exchange, such for instance as *Anomola*, *Notha*, *Semibruanea*, *Atriplicis*, *Advena*, *Leucographa*, *Depuncta*, *Caliginosa*, *Ophiogramma*, *Hispida*, *Trepida*, *Chaonia*, *Dodonæa*, and many others. Can anyone explain this.

Before finishing I would just like to tell a little tale that happened some thirty years ago. A generous clergyman was informed that many collectors were in want of good specimens of *Populi*, *Palpina*, *Megacephala*, *Dictæa*, *Dodonæa*, and *Ligustri*, so he gave notice that any Entomologist in want of any of these was to write to him and if successful he should be supplied. Nine months passed, when another notice appeared stating that the generous clergyman had had many applications and had selected 22 gentlemen to be the recipients. He says some of his correspondents expressed a desire for specimens of the insects offered, but he was sure this was unintentional. He then offered *Dodonæa* and *Megacephala* to all, *Populi* to the first 18, *Palpina* to the first 12, and *Ligustri* to the first 9. He finishes by repeating he expected no return for the insects. All he required was the postage, and if any correspondent at some future period turned up some rarity in abundance they would perhaps remember him. He was sorry he had disappointed some, but he had worked long and hard for these.—OMEGA.

NOTES AND OBSERVATIONS.

A PLAGUE OF FLIES.—A correspondent mentions a plague of flies in Kent. I was rather surprised you had not noticed the plague in the North. I fancy about the same time—two or three weeks since—we had them here far too abundantly. The air was thick with them, it just seemed to be raining flies,

I suppose they were the same kind as your correspondent mentions, a large black aphid. My husband was at Whitby the week before, and did not notice them till he reached Whitby, when he found the place swarming with them, and on his return the train passed through a dense cloud of them, all the way to Stokesley. The weather at that time was close and foggy. Can you explain the cause of their unusual abundance? The newspapers mentioned them, and said they had appeared all along the Yorkshire coast as far as Hull.—ISABEL ROBSON, Stockton-on-Tees.

VARIETY OF THE LARVA OF *SMERINTHUS OCELLATUS*.—It is noteworthy that a variety of an insect may occur in a very restricted locality for a number of years. For example, there is a curious type of the larva of *S. ocellatus*, which is adorned with rows of red spots. I first observed this type on some young poplars about twelve years ago, the moths, if reared, present no aberration from the customary markings; and last summer, passing the same spot, I picked a couple of these larvæ off the leaves, so that it is a fair presumption this variety is hereditary on the spot. It is commonly supposed, and is often stated in books, that the Hawk-moths take extensive flights; the males, perhaps, may in some species, but the females are frequently sluggish, laying most of the eggs near where they emerged, though this task accomplished, they sometimes fly off with remarkable briskness.—J. R. S. CLIFFORD.

SUPPOSED GLOW-WORMS.—Several persons have reported to me captures of Glow-worms along our Kentish lanes this summer. In one instance, the insect was exhibited to a little crowd at a railway station. Where I have been able to examine a specimen, it has turned out to be the luminous centipede only.—J. R. S. CLIFFORD.

PRESERVING THE COLOURS OF FLOWERS.—An apparatus for drying botanical specimens, by which the natural colours of leaves and flowers could be effectually preserved, was described and illustrated in the May number of the "Scientific Enquirer" (London: Bailliere, Tindale, and Cox.)—A.A.

HOP CATS.—In the last number I notice that Mr. Clifford mentions that the larvæ of *O. pudibunda* are called "Hop Cats" in the vicinity of Gravesend. Before the present season I had never heard the name of Hop Cat, but having expressed a desire to a large grower of hops for some Hop Dogs, he asked me whether I wanted any Hop Cats also. Wishing to know what these were, I said "yes," and shortly afterwards received two boxes, one containing Hop Dogs, and the other Cats, which turned out to be *O. antiqua*. On further enquiry, I found that these two names were in general use

throughout the district between Foot's Cray and Sevenoaks, to distinguish the two species. Fortunately for the entomologist, both are considered friends by the farmers, who imagine they devour the "fly."

In answer to Mr. Clifford's query regarding *O. gnostigma*, I may mention that it was fairly common at Wimbledon three years ago, but I have not visited the locality more recently.—ERNEST ANDERSON.

POLYOMMATUS DISPAR.—It is worth noting, respecting the Editor's interesting observation on *P. dispar*, in last month's *Young Naturalist*, that there is a very fine series of that species in the Doubleday collection, at the Bethnal Green Museum. There is a small payment on Wednesdays. This collection, to the country entomologist, is one of the sights of London, and should not be missed when paying us a visit; and, doubtless, he will consider the London entomologist very fortunate in having such a splendid collection so readily accessible for naming specimens. As our charming study is so often receiving fresh recruits, the above facts will perhaps bear repetition.—G. PEARSON, Stoke Newington.

URGENTLY WANTED, for the purpose of illustrating a paper shortly to be published in the "Young Naturalist," by Mr. Chas. H. H. Walker, specimens of *Strepsiptera*, *Thysanoptera*, *Hymenoptera* (genus *Mymaridæ*, *Chalcididæ*), various species of Aphides, and of Exotic *Lycænidæ*. Damaged specimens will do. Mr. F. N. Pierce, 143, Smithdown Lane, Liverpool, will gladly receive and hand on any specimens sent, which can be returned when done with.

THANKS.

May I, at the close of the Seventh Volume, express my grateful thanks to all those who have done so much to render *The Young Naturalist* a success. To mention names would be invidious, and to some whose names do not appear in the index of contributors, I am deeply indebted. I would thank also all those kind friends who have done so much to increase the circulation of the magazine. I hope and believe that the Eighth Volume will prove more worthy of their recommendation. To each and all I say—

"THANKS."

A LIST
OF
BRITISH LEPIDOPTERA
AND THEIR
NAMED VARIETIES.

BY
JOHN E. ROBSON
AND
JOHN GARDNER.

Dedicated

(BY SPECIAL PERMISSION)

TO THE MEMBERS OF THE

HAGGERSTON ENTOMOLOGICAL SOCIETY.

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P R E F A C E.

THE objects that should be kept in view in preparing a Catalogue of Lepidoptera are two in number, both of the greatest possible importance. The first is that each species should have a distinctive name by which it can be recognised now, and by which all that has been written about it can be rightly attributed to it. The second object should be to arrange these names in such order, that as far as possible, each species will be surrounded by those to which it is most closely allied. Briefly, the objects should be—Correct Nomenclature and Natural Arrangement.

It has, unfortunately, happened that many species have been described by more than one writer, and different names given by each. It has also happened that the same name has been given by different writers to distinct species. It has thus become necessary for Entomologists to know what species have been described by various writers, and what names have been bestowed upon them, before their past history can be correctly followed. Hence the importance of what are called Synonymic lists or catalogues, in which all the names that have ever been given to the species are placed in chronological order, with the references to the works in which such names are used. In such a list or catalogue the oldest name stands first, and there is a well understood rule among naturalists, called "The Law of Priority," that such oldest name shall be that by which the species is known. Before it can be decided which is the oldest name, it is necessary to ascertain that the different authors really meant that particular species, and therefore their figure or description must be examined. To do this is not only a work of very great labour, and requiring great knowledge of different languages, but it also needs an amount of discrimination and judgment that are not the lot of many, and that few possess in equal degree. There has thus arisen a wide diversity of opinion as to the authority that should be given to the works of different authors, and a consequent diversity as to the names by which the

various species should be known. While each admitted that "The Law of Priority" was always binding, they denied its application in particular cases for various reasons. Insufficient descriptions, bad figures, or other like objections are enough for the rejection of any name; but when one rejects what another accepts, we are landed at once in a maze of doubt and difficulty, that is troublesome enough even to those that understand it, while to beginners it is so perplexing that it is more likely to deter than to encourage. Even this is not the worst, for those who have prepared the various synonymic catalogues have modified their views very considerably between the different editions of their works. Doubleday's second edition of his Synonymic List of British Lepidoptera is widely different from the first, both in nomenclature and arrangement. Staudingers Catalogue published in 1871 differs very much from that of the first edition. Guenée, in the introduction to his "Noctuelites," gave a list of the authors whose nomenclature he rejected and his reasons for doing so. Others have accepted some of the nomenclature thus rejected, and in turn have rejected others. All this has been done with a view to the perfection of our lists, but it has only helped to increase the confusion. From all this only one deliverance can be looked for. It is no use an individual, particularly one unknown in the entomological world, attempting to produce a catalogue that will be satisfactory to every one. The leading Societies of the various countries where Entomology is largely followed, must arrange for the preparation of one, which shall be finally binding on every one, and whose nomenclature shall be subject to no further alteration. For this we must wait and hope. In the meantime, the following list of British species is submitted as an attempt to unravel the tangle and assist beginners in this country. It contains—

1. The name of each species in ordinary use in Britain and the authority for it.
2. The name or names that have been preferred by different writers, and the authority.
3. The date at which each name was given, when there are more than one.
4. The names given to varieties and the authority for them.
5. A brief description of the difference between such variety and the type.

No synonymy is given further than the above. The degree of authority to be attached to each catalogue is open to diversity of opinion just as in all else connected with nomenclature. The greater part of the changes recently made by the German authors, are owing to the acceptance by them of Hufnagel's names, which are rejected by all other writers. They are to be found in the second, third, and fourth volumes of the "Berlinisches Magazin, &c,"

published in 1766-7 and 9. If these names were still rejected, comparatively few alterations would be made. Doubleday's list having had almost universal acceptance in this country, we have not hitherto felt the difficulties of nomenclature much. Now that the more scientific of the two leading magazines adopts one nomenclature, and the other another, we are worse than any one, for the capture of the same species would, in numberless cases, be announced under different names in these two journals, and only experts would know what was meant.

It is hoped the following list will serve as a key to the mystery. The authorities quoted are, for Butterflies only, Kirby's Synonymic Catalogue of Rhopalocera; and generally, Doubleday's Synonymic List (2nd edition) and the supplement to it; Staudinger's "Catalog der Lepidopteren des Europæischen Faunengebiets," edition 1871; "Catalogue methodique des Lepidoptères d'Europe," by M. Berce, 1861. The names of Stainton's Manual are also occasionally quoted. In the very few cases where Mr. South has not used the German nomenclature of Staudinger, his name is also added. There can thus be seen at one glance what names are used in each country.

The arrangement adopted is mainly that of Dr. Boisduval and M. Guenée, which seems more natural than that of Doubleday; and is certainly superior to the German method, where sometimes a dozen or more incongruous genera are mixed in one heterogeneous mass.

JOHN E. ROBSON.

JOHN GARDNER.

ABBREVIATIONS.

- m.* Male.
f. Female.
v. Variety.
G1. First Brood.
G2. Second Brood.
u.s. Underside.
h.w. Hind wing.

When these are not used, the upper side or the fore wing is understood.

- * Prefixed to species, the type of which does not occur in Britain, but only the varieties which follow.



RHOPALOCERA.

Papilionidæ, Bdv.

PAPILIO, L.

Machaon, L.

Pieridæ, Bdv.

APORIA, Hb.

Cratægi, L.

PIERIS, Schr.

Brassicæ, L.

Rapæ, L.

Napi, L.

Daplidice, L.

ANTHOCARIS, Bdv.

Cardamines, L.

LEUCOPHASIA, Steph.

Sinapis, L.

v. (G. 1.) *Lathyri*, Hb. (Markings on u.s.h.w. greener, and covering more of the wing.)

v. (G. 2.) *Diniensis*, Bdv. (Tip blotch not reaching margin, u.s.h.w. less distinctly marked.)

v. f. *Erysimi*, Bork. (Tip blotch indistinct, u.s.h.w. nearly white.)

Rhodoceridæ, Bdv.

GONEPTERYX, Leach.

Rhamni, L.

COLIAS, Bdv.

Edusa, Fab. 1787.

Crocus, Fourcroy 1785. ("Ent. Paris II. p. 250,") Kirby.

v. f. *Helice*, Hb. (Sulphur yellow).

Hyale, L.

v. f. *Pallida*. (Whitish yellow).

Lycænidæ, Bdv.

ZEPHYRUS, Dalm. Kirby.

Betulæ, L.

Quercus, L.

THECLA, Fab.

Rubi, L.

W-album, L.

Pruni, L.

POLYOMMATUS, Ltr.

[Dispar, Haw. 1803. Kirby. Staudinger.
 [Hippothæ, Esp. 1778. (Non Linn).] Doubleday.

Phlæas, L.

v. *Schmidtii*, Gerh. (Silvery white).

LYCÆNA, Tr.

Arion, L.

v. *Alcon*, Steph. (Black spot at disc only.)

Acis, W.V. 1776. Berce. Doubleday.

Semiargus, Rott. 1775. Staudinger. Kirby.

Alsus, W.V. 1776. Berce. Doubleday. Kirby.

Minima, Fuesl. 1775. Staudinger.

Argiolus, L.

Corydon, Poda.

Adonis, W.V. 1776. Berce. Doubleday.

Thetis, Rott. 1775. Kirby.

Bellargus, Rott. 1775. Staudinger.

Alexis, W.V. 1776. (Scop. 1763, var. 2.) Doubleday.

Icarus, Rott. 1775. Kirby. Staudinger.

v. *Icarinus*, Scriba. (No spots on *u.s.* between base & disc.)

Agestis, W.V. 1776. Berce. Doubleday.

Alexis, Scop. 1763. Kirby.

Medon, Hufn. 1766.

Astrarche, Bgstr. 1779. Staudinger.

v. *Æstiva*. Std-Cat. (*u.s.* brown.)

v. *Salmacis*, Steph. (Spots on *u.s.* without black centres.)

v. *Artaxerxes*, Fab. (White spot at disc; *u.s.* as *Salmacis*.)

Ægon, W.V. 1776. Doubleday. Berce.

Argus, L. 1758. Kirby.

Argyrotoxus, Bgstr. 1779. Staudinger.

Lemoniidæ, Kirby.

NEMEOBIUS, Steph.

Lucina, L.

Nymphalidæ, Bdv.

APATURA, Och.

Iris, L.

v. *Iole*, W.V. (No white band.)

LIMENITIS, Bdv.

Sibylla, L.

v. *Obliteræ*. (White band more or less obliterated.)

PYRAMEIS, Hub.

Atalanta, L.

Cardui, L.

VANESSA, Och.

Io. L.

Antiopa, L.

v. *Hygiea*, *Hdrch.* (Border white.)

Polychloros, L.

Urticæ, L.

v. *Polaris*, *Std. Cat* (Central costal blotch joined to inner blotch, forming a dark band, zigzag across the wing.)

C-album, L.

v. (G. 1.) *Hutchinsoni*. (Paler, both upper and under sides.)

MELITÆA, Fab.

Artemis, W.V. 1776.

Berce. Doubleday.

Aurinia, Rott, 1775.

Kirby. Staudinger.

v. *Hibernica*, *Birchall*. (Colours much brighter.)v. *Scotica*, *White*. (Duller, less densely scaled.)

Cinxia, L.

Athalia, Rott.

ARGYNNIS, Och.

Selene, L.

Euphrosyne, L.

Lathonia, L.

Adippe, L.

v. *Cleodoxa*, *Och.* (No silver spots on *u.s.*)v. *Chlorodippe*, *H.S.* (*U.s.* yellowish green above the central spot.)

Aglaiia, L.

Paphia, L.

v. *f. Valezina*, *Esp.* (Greenish fuscous.)

Satyridæ, Bdv.

MELANARGIA, Meig.

Galathea, L.

v. *Leucomelas*, *Hb.* (*u.s.* nearly unicolourous.)

EREBIA, Dalm.

Ephron, Knock. (The Scotch form.)

v. *Cassiope*, *Fab.* (The Cumberland form. Smaller, paler, spots with centres less distinct.)

Medea, W.V. 1776.

Kirby. Doubleday Sup.

Æthiops, *Esp.* 1777.

Staudinger.

Blandina, *Fab.* 1793.

Berce. Doubleday.

SATYRUS, *Fab.*

Ægeria, L.

v. *Egerides*, *Std. Cat.* (The type has the spots deep orange, the var. pale ochreous. The type very rarely occurs in Britain.)

Megæra, L.

EPINEPHELE, *Hub.*

Janira, L.

v. *Hispulla*, *Esp.* (?) (Larger, brighter.)

Tithonus, L.

Hyperanthus, L.

v. *Arete*, *Mull.* (*U.s.* with or without white spots, entirely without yellow rings.)

HIPPARCHIA, *Fab.*

Semele, L.

v. *Aristæus*, *Bon.* (Bright red ochre.)

CENONYMPHA, *Hub.*

Typhon, *Rott.* 1775. (All the British forms are included in the *Davus*, *Fab.* 1777. named vars.)

v. *Laidion*, *Bork*, 1788. (Dark, band and eyes on *u.s.* very distinct.)

Typhon, *Haw*, 1829.

v. *Philoxenus*, *Esp.* 1777. (Paler, band on *u.s.* broken, eyes indistinct.)

Rothliebii, *Std. Cat.* 1861.

v. *Isis*, *Thunb.* (Smaller, still paler, band and eyes very indistinct or wanting.)

v. *Orcadæ*. (Pale fawn, lighter margins, no band on *u.s.* small central patch.)

Pamphilus, L.

v. *Lyllus*, *Esp.* (Dark border to all wings.)

v. *Albescens*. (Whitish yellow.)

Hesperidæ, Leach.

SYRICTHUS, Bdv.

Malvæ, L. 1761.	Berce.	Kirby.	Staudinger.
<i>Alveolus</i> , Hub. 1798.			Doubleday.
v. <i>Fritillum</i> , W.V. 1776.	(Spots confluent.)		Kirby.
<i>Taras</i> , Meig. 1829.			Staudinger.

NISONIADES, Hub.

Tages, L.

HESPERIA, Fab.

Linea, W.V. 1776.	Berce.	Doubleday.
<i>Thaumas</i> , Hufn. 1766.	Kirby.	Staudinger.
Actæon, Rott.		
Sylvanus, Esp.		
Comma, L.		

STEROPES, Bdv.

Paniscus, Fab. 1775.	Berce.	Doubleday.
<i>Palemon</i> , Pall. 1771.	Kirby.	Staudinger.

HETEROCERA.**SPHINGES, L.****Sesiidæ, H.S.**

TROCHILIUM, Scop.

Apiformis, L.		
Bembeciformis, Hb. 1803.	Berce.	Doubleday.
<i>Crabroniformis</i> , Lewin. 1797.		Staudinger.

SESIA, Fab.

Asiliformis, W.V. 1776.	Berce.	Doubleday.
<i>Tabaniformis</i> , Rott. 1775.		Staudinger.
<i>Vespiiformis</i> , West. 1841.		Stainton.
Spheciformis, W.V. 1776.		Doubleday.
<i>Sphegiformis</i> , Fab. 1793.	Berce.	Staudinger.
Scoliiformis, Bkh.		
Andreniformis, Lasp. 1801.	Berce.	Staudinger.
<i>Allantiformis</i> , Wood. 1839.		Doubleday.
Musciformis, View.	Berce.	Doubleday Sup.
<i>Philanthiformis</i> , Lasp.		Staudinger.
		"Intelligencer," viii. 147.
		"Annual," 1861, 83.

Tipuliformis, L.

Cynipiformis, Esp. 1782.

Asiliformis, Rott. 1775.

Ichneumoniformis, W.V.

Chrysidiformis, Esp.

Formiciformis, Esp.

Culiciformis, L.

Myopiformis, Bork.

Berce. Doubleday.
Staudinger.

Sphingidæ, Bdv.

MACROGLOSSA, Och.

Fuciformis, L. (Non Esp.)

Bombyliformis, Och. (Non Esp.)

Stellatarum, L.

CHÆROCAMPA, Dup.

Celerio, L.

Porcellus, L.

Elpenor, L.

Nerii, L.

DEILEPHILA, Och.

Euphorbiæ, L. (Doubtful if British.)

Galii, W.V.

Livornica, Esp. 1779.

Lineata, Fab. 1787.

Staudinger. Stainton.
Berce. Doubleday.

SPHINX, L.

Ligustri, L.

Convolvuli, L.

ACHERONTIA, Och.

Atropos, L.

SMERINTHUS, Lat.

Ocellatus, L.

Hybridus, Std. Cat. non West. (The hybrid between *Ocellatus*
and *Populi*, partaking of the
characters of both.)

Populi, L.

Tiliæ, L.

Zygænidæ, Bdv.

ZYGÆNA, Fab.

ANTHROCERA, Steph:

Filipendulæ, L.

v. *Chrysanthemæ*, Esp. (Spots obscured.)v. *Ochsenheimeri*, Zell. (Spot nearest tip small and divided by nervure. Border to *h.w.* broader.)v. *Cytisi*, Hb. (Spots confluent in three pairs.)v. *Cerinus*. (Spots and *h.w.* pale yellow.)

Loniceræ, Esp.

Trifolii, Esp.

v. *Confluens*, Std. Cat. (All spots confluent.)

Meliloti, Esp.

*Exulans, Hoch.

v. *Vanadis*, Dalm. (Thinly scaled, no white scales)

*Minos, W.V.

v. *Nubigena*, Ld. (Abd. hairy; wings semi-transparent.)

PROCRIIS, Fab.

Geryon, Hb.

Statices, L.

Globulariæ, Hb.

Lithosidæ, Bdv.

LITHOSIA, Fab.

Rubricollis, L.

Quadra, L.

Complana, L.

Sericea, Gregson, 1860.

Staudinger.

Molybdeola, Gn. 1861.

Doubleday Sup.

Lurideola, Zinc. 1817.

Doubleday Sup. Staudinger.

Complanula, Bdv. 1834.

Berce. Doubleday.

Caniola, Hb.

Pygmæola, Dbl.

Deplana, Esp. 1787.

Doubleday Sup. Staudinger.

Helveola, Och. 1810.

Berce.

Aureola, Hb. 1793.

Doubleday.

Sororcula, Hufn. 1767.

Staudinger.

Griseola, Hb.

v. *Stramineola*, Dbl. (Straw colour.)

Muscerda, Hb.

Mesomella, L.

CALLIGENIA, Dup.

Miniata, Forst.

SETINA, Steph.

Irrorella, L.

NUDARIA, Haw.

Senex, Hb.

Mundana, L.

NOLA, Leach.

Centonalis, Hb.

Albulalis, Hb.

Strigula, W.V.

Cristulalis, Dup. 1826-38, non. Hb. 1827-41. Berce. Double-
[day. Stainton.

Confusalis, H.S. 1860. Doubleday Sup. Staudinger.

Cucullatella, L.

EMYDIA, Bdv.

Grammica, L. Extinct.

Cribrum, L.

DEIOPEIA, Curt.

Pulchella, L.

Chelonidæ, Bdv.

EUCHELIA, Bdv.

Jacobææ, L.

CALLIMORPHA, Lat.

Dominula, L.

NEMEOPHILA, Steph.

Russula, L.

Plantaginis, L.

v. *Hospita*, W.V. (Markings paler on both wings.)

CHELONIA, Lat.

Caja, L.

Villica, L.

ARCTIA, Bdv.

Fuliginosa, L.

v. *Borealis*, Std. (Without red on *h.w.*)

Lubricipeda, L.

v. *Zatima*, Cr. (With long black streaks on *f.w.*)

Menthastris, Esp.

v. *Walkeri*, Curt. (Spots confluent, forming stripes.)

Urticæ, Esp.

Mendica, L.

Liparidæ, Bdv.

LIPARIS, Och.

Monacha, L.

Dispar, L.

Salicis, L.

Auriflua, W.V. 1776.

Similis, Fuesl. 1775.

Berce. Doubleday.
Staudinger.

Chrysorrhœa, L.

LÆLIA, Steph.

Cœnosa, Hb.

DASYCHIRA, Steph.

Pudibunda, L.

Fascelina, L.

ORGYIA, Och.

Gonostigma, L.

Antiqua, L.

DEMAS, Steph.

Coryli, L.

Bombycidæ, H.S.

TRICHIURA, Steph.

Cratægi, L.

PÆCILOCAMPA, Steph.

Populi, L.

ERIOGASTER, Gn.

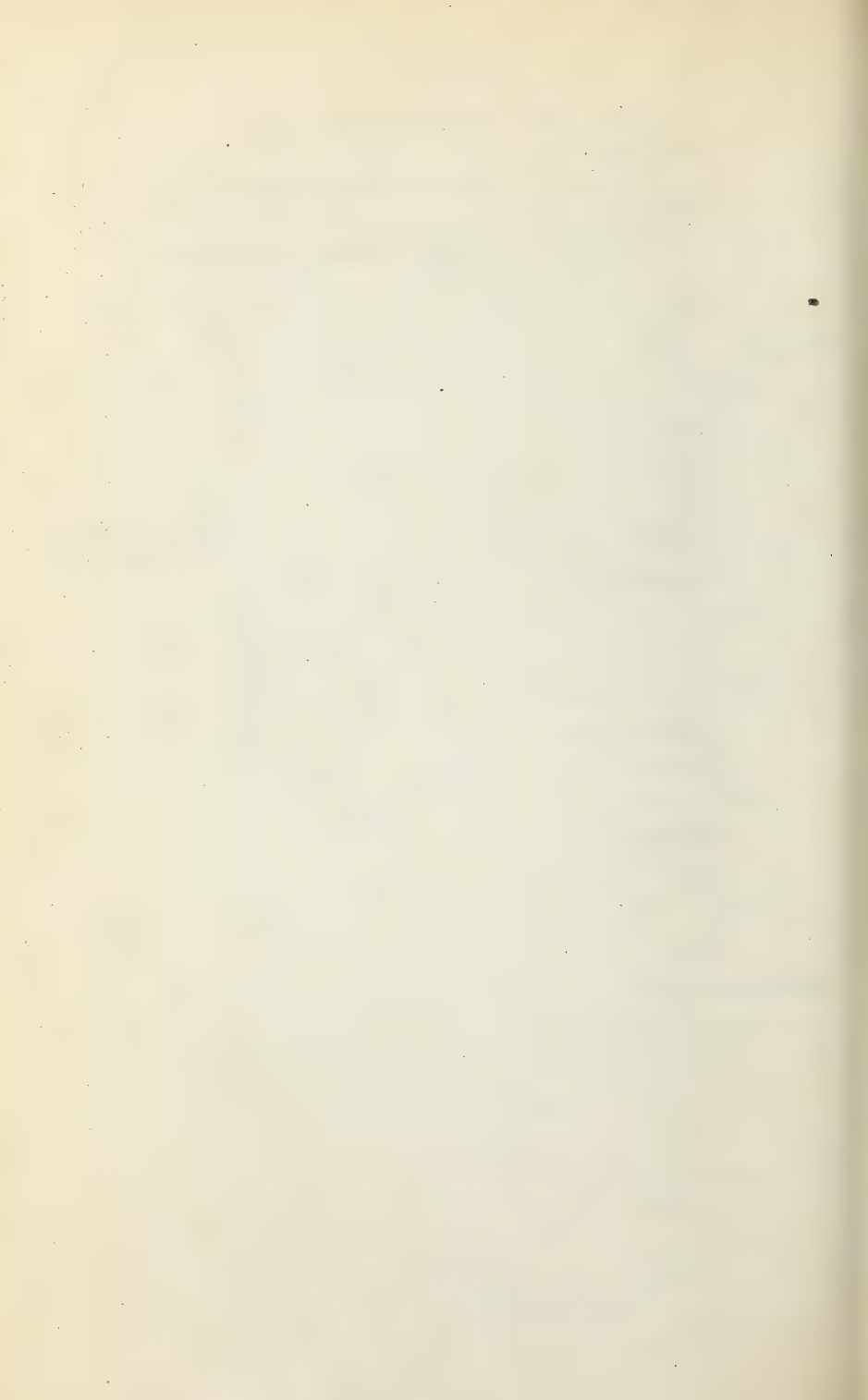
Lanestris, L.

BOMBYX, L.

Neustria, L.

v. *Bilineatus*, Haw.

Castrensis, L.



Rubi, L.

Quercus, L.

v. *Callunæ*, Palmer. (The dark moorland form.)

v. *Roboris*, Schr. (The pale form.)

Trifolii, W.V.

ODONESTIS, Germ.

Potatoria, L.

LASIOCAMPA, Lat.

Quercifolia, L.

Ilicifolia, L.

ENDROMIS, Och.

Versicolora, L.

SATURNIA, Bdv.

Carpini, L.

Cossidæ, H.S.

COSSUS, Fab.

Ligniperda, Fab. 1793.

Cossus, L. 1758.

Berce. Doubleday. South.
Staudinger.

ZEUZERA, Latr.

Æsculi, L. 1767.

Pyrina, L. 1746.

Berce. Doubleday.
Staudinger.

MACROGASTER, Dup.

Arundinis, Hb. 1803.

Castanea, Hb. 1790.

Berce. Doubleday.
Staudinger.

Hepialidæ, H.S.

HEPIALUS, Fab.

Hectus, L.

Lupulinus, L.

Sylvinus, L.

Velleda, Hb.

v. *Carnus*, Steph. (Unicolorous.)

Gallicus, Ld. 1852.

Doubleday.
Staudinger.

Humuli, L.

v. *Hethlandica*, Std. Cat. (Darker, males more or less like the females.)

Cochliopidæ, Gn.

LIMACODES, Lat.

Testudo, W.V. 1776.
Limacodes, Hufn. 1767

Berce. Doubleday.
 Staudinger.

Drepanulidæ, H.S.

PLATYPTERYX, Lasp.

Lacertinaria, L. 1767.
Lacertula, W.V. 1776.

Staudinger.
 Berce. Doubleday.

Sicula, W.V. 1776.
Harpagula, Esp. 1786.

Berce. Doubleday.
 Staudinger.

Falcataria, L. 1767.
Falcula, W.V. 1776.

Staudinger.
 Berce. Doubleday.

v. *Pallida*, White. (Paler.)

Hamula, W.V. 1776.
Binaria, Hufn. 1767.

Berce. Doubleday.
 Staudinger.

Unguicula, Hb. post. 1797.
Cultraria, Fb. 1795.

Berce. Doubleday.
 Staudinger.

CILIX, Leach.

Spinula, W.V. 1776.
Glaucata, Scop. 1763.

Berce. Doubleday.
 Staudinger.

Notodontidæ, Bdv.

DICRANURA, Lat.

Bicuspis, Bkh.
 Furcula, L.
 Bifida, Hub.
 Vinula, L.

STAUROPUS, Germ.

Fagi, L.

PETASIA, Steph.

Cassinea, W.V. 1776.
Sphinx, Hufn. 1767.
 Nubeculosa, Esp.

Berce. Doubleday.
 Staudinger.

PTILODONTIS, Steph.

Palpina, L.

LOPHOPTERYX, Steph.

Camelina, L.
 Cucullina, W.V. 1776.
Cuculla, Esp. 1786.
 Carmelita, L.

Berce. Doubleday.
 Staudinger.

LEIOCAMPA, Steph.

Dictæa, L. 1767.

Tremula, Cl. 1759.

Dictæoides, Esp.

Berce. Doubleday. South.
Staudinger.

NOTODONTA, Och.

Dromedarius, L.

Trilophus, W.V.

Ziczac, L.

PERIDEA, Steph.

Trepida, Esp.

Bicolora, W.V.

DRYMONIA, H.S.

Chaonia, W.V.

Dodonæa, W.V. 1776.

Trimacula, Esp. 1785.Berce. Doubleday.
Staudinger.

PTILOPHORA, Steph.

Plumigera, W.V.

GLUPHISIA, Bdv.

Crenata, Esp.

DILOBA, Bdv.

Cæruleocephala, L.

PYGÆRA, Bdv.

Bucephala, L.

CLOSTERA, Hoffm. ? Steph.

Curtula, L.

Anachoreta, Fab.

Reclusa, W.V. 1776,

Pigra, Hufn. 1767.Berce. Doubleday.
Staudinger.**NOCTUÆ, Bdv.****Noctuo-Bombycidæ, Bdv.**

THYATIRA, Och.

Batis, L.

Derasa, L.

CYMATOPHORA, Tr.

Duplaris, L.

Fluctuosa, Hub.

Diluta, W.V.

v. *Nubilata*. (Three or four dark bands.)

Or, W.V.

Ocularis, L. 1767.

Berce. Doubleday.

Octogesima, Hub. 1786.

Staudinger.

Flavicornis, L.

Ridens, Fab.

Bryophilidæ, Gn.

BRYOPHILA, Tr.

Glandifera, W.V. 1776.

Berce. Doubleday.

Muralis, Forst. 1771.

Staudinger.

v. *Par.*, Hub. (Less marked, lines on *f.w.* wanting.)

Impar, Warren.

Perla, W.V.

Algæ, Fab. Two specimens only in 1859.

Bombycoidæ, Bdv.

DIPHThERA, Och.

Orion, Esp.

v. *Runica*, Haw. (Fewer black marks. Scarcely distinguishable from type.)

ACRONYCTA, Och.

Tridens, W.V.

Psi, L.

Leporina, L.

v. *Bradyporina*, Tr. (Greyer than the type.)

Aceris, L.

v. *Candelisequa*, Esp. (Indistinctly marked). Berce. Staud-

Infuscata, Haw. Doubleday. [inger.

Megacephala, W.V.

Strigosa, Fab.

Alni, L.

Ligustri, W.V.

v. *Coronula*, Haw.

Rumicis, L.

v. *Salicis*, Curt. (Darker.)

Auricoma, W.V.

Menyanthidis, Esp.

Myricæ, Gn.

SIMYRA, Och.

Venosa, Bkh. 1792.

Albovenosa, Goetz. 1781.Berce. Doubleday.
Staudinger.**Leucanidæ, Gn.**

SYNIA, Dup.

Musculosa, Hub.

LEUCANIA, Och.

Conigera, W.V.*Vitellina*, Hub.*Turca*, L.*Lithargyria*, Esp.*Albipuncta*, W.V.*Extranea*, Gn. (?)*Loreyi*, Dup. (?)*Obsoleta*, Hub.*Putrescens*, Hub.*Littoralis*, Curt.*Pudorina*, W.V. 1776.*Impudens*, Hub. 1793.Berce. Doubleday.
Staudinger.*Comma*, L.*Straminea*, Tr.*Impura*, Hub.*Pallens*, L.*Phragmitidis*, Hub.

MELIANA, Curt.

Flammea, Curt.

SENTA, Steph.

Ulvæ, Hub.v. *Wismariensis*, Sch. (A central black dash.)v. *Nigrostriata*, Std. Cat. (Veined with black, principally
towards the costa.)v. *Bipunctana*, Haw. (Two distinct black spots.)

TAPINOSTOLA, Led.

Bondii, Knaggs.

NONAGRIA, Och.

Despecta, Tr. 1825.*Rufa*, Haw. ? 1810.Berce. Doubleday.
Staudinger.*Fulva*, Hub.

- Concolor, Gn.
 Helmanni, Ev.
 Elymi, Tr.
 Neurica, Hub. Doubleday.
Hessii, Bdv. South.
 v. Arundineta, Schmidt. (Paler.) Staudinger.
 Brevilinea, Fenn.
 v. Alinea, Farn. (Without the basal streak.)
 Geminipuncta, Hatch.
 Cannæ, Och.
 Sparganii, Esp.
 Typhæ, Esp. 1789. Berce. Doubleday.
Arundinis, Fab. 1787. Staudinger.
 Lutosa, Hub. Ante 1804. Berce. Doubleday. Staudinger.
Crassicornis, Haw. 1810. Stainton.

Apamidæ, Gn.

GORTYNA, W.V.

- Flavago, W.V. 1776. Berce. Doubleday.
Ochracea, Hub. 1786. Staudinger.

HYDRÆCIA, Gn.

- Nictitans, L.
 v. Erythrostigma, Haw. (Stigmata orange.)
 Petasitis, Dbld.
 Micacea, Esp.

AXYLIA, Hb.

- Putris, L.

XYLOPHASIA, Steph.

- Rurea, Fab.
 v. Alopecurus, Esp. 1777-94. (Unicolorous, or nearly so.)
 Combusta, Dup., 1826-38.

Lithoxylea, W.V.

- Sublustris, Esp.
 Polyodon, L. 1761. Berce. Doubleday.
Monoglypha, Hufn. 1767. Staudinger.
 v. Infuscata, White. (Black or nearly so.)
 Hepatica, L.
 Scolopacina, Esp.

DIPTERYGIA, Steph.

Pinastri, L. 1761.

Scabriuscula, L. 1758.Berce. Doubleday.
Staudinger.

XYLOMYGES, Gn.

Conspicillaris, L.

v. *Melaleuca*, View. (Costal and hind margins pale coloured.)

APOROPHYLA, Gn.

Australis, Bdv.

LAPHYGMA, Gn.

Exigua, Hb.

NEURIA, Gn.

Saponariæ, De Geer. 1771-8.

Reticulata, Vill. 1789.Berce. Doubleday.
Staudinger.

HELIOPHOBUS, Bd.

Popularis, Fab.

Hispida, Hb.

CHARÆAS, Steph.

Graminis, L.

v. *Tricuspis*, Esp. (Pale markings wanting, except a trifid spot at stigmata.)

PACHETRA, Gn.

Leucophæa, W.V.

CERIGO, Steph.

Cytherea, Fab. 1794.

Matura, Hufn. 1767.Berce. Doubleday.
Staudinger.

LUPERINA, Bdv.

* Luteago, W.V.

v. *Barrettii*, Dbld. (Darker, and more blotched and marbled.)

Testacea, W.V.

Guenéi, Dbd. ? (Only three known.)

Dumerili, Dup.

Cespitis, W.V.

CRYMODES, Gn.

Exulis, Lef.

MAMESTRA, Och.

Abjecta, Hb.

Anceps, Hb. 1804. (Guenée says the synonymy of this species
Sordida, Bork, 1792. is rather confused, but after examining
Infesta, Och. 1807. all the claims he gives precedence to
Anceps.)

Albicolon, Hb.
 Furva, W.V.
 Brassicæ, L.
 Persicariæ, L.

APAMEA, Och.

Basilinea, Fab.
 Connexa, Bork.
 Gemina, Hb. (The type is nearly unicolorous, the var. more
 v. *Remissa*, Tr. varied.)
 Unanimis, Tr.
 Ophiogramma, Esp.
 Fibrosa, Hb.
 v. *Leucostigma*, Hb. (Unicolorous dark, with distinct white
 stigmata.)

Oculea, L. 1761. Berce. Doubleday.
Didyma, Esp. 1788. Staudinger.
 v. *Furca*, Haw. (Brown at costa, inner half of wing paler.)
 v. *Rava*, Haw. (Brown across centre, base and hind margin
 paler.)
 v. *I-niger*, Haw. (A distinct - like mark below the stigmata.)
 v. *Lugens*, Haw. (Black, with distinct white stigmata.)
Leucostigma, Esp.

MIANA, Steph.

Strigilis, L.
 v. *Præduncula*, Haw. (Broadly white at hind margin.)
 v. *Latruncula*, W.V. (Much marbled.)
 v. *Æthiops*, Haw. (Black.)
 Fasciuncula, Haw.
 v. *Cana*, Std. Cat. (Clay coloured.)
 Literosa, Haw.
 Furuncula, W.V. 1776. Berce. Doubleday.
Bicoloria, Vill. 1789. Staudinger.
 v. *Humeralis*, Haw. (Dark central band.)
 v. *Terminalis*, Haw.
 v. *Rufuncula*, Haw. (Pale unicolorous.)
 Captiuncula, Tr.
Expolita, Stainton;

Arcuosa, Haw.

CELÆNA, Steph.

Haworthii, Curt.

Caradrinidæ, Bdv.

GRAMMESIA, Steph.

Trilinea, W.V. 1776.

Berce, Doubleday.

Trigrammica, Hufn. 1767.

Staudinger.

v. *Bilinea*, Hb. (Only two lines, often indistinct.)

HYDRILLA, Bdv.

Palustris, Kob.

ACOSMETIA, Steph.

Caliginosa, Hb.

CARADRINA, Och.

Morpheus, Rott.

Alsines, Brahm.

Blanda, W.V. 1776.

Berce. Doubleday.

Taraxaci, Hub. 1793-27.

Staudinger.

Ambigua, Fab.

Cubicularis, W.V. 1776.

Berce. Doubleday.

Quadrupunctata, Fab. 1775.

Staudinger.

Noctuidæ, Gn.

RUSINA, Steph.

Tenebrosa, Hub.

AGROTIS, Och.

Valligera, W.V. 1776.

Berce. Doubleday.

Vestigialis, Rott. 1776.

Staudinger.

Putæ, Hb.

Suffusa, W.V.

Saucia, Hub.

Segetum, W.V.

Lunigera, Steph.

Exclamationis, L.

Corticea, W.V.

Cinerea, W.V.

Ripæ, Hb.

Cursoria, Hufn.

Nigricans, L.

Tritici, L.
 Aquilina, W.V.
 Obelisca, W.V.
 Agathina, Dup.
 Porphyrea, W.V.
 Præcox, L.
 Ravida, W.V.
 Pyrophila, W.V.
 Helvetina, Bdv. (?)
 Lucernea, L.
 Ashworthii, Dbld.

TRIPHÆNA, Och.

Janthina, W.V.
 Fimbria, L. (The pale form is the type, the dark the variety.)
 v. *Solani*, Fab.
 Interjecta, Hb.
 Subsequa, W.V. 1776. Berce. Doubleday.
Orbona, Hufn. 1767. Staudinger.
 Orbona, Fab. 1787. (Unicolorous reddish brown.) Berce.
Comes, Hb. 1793-1827 Staudinger. [Doubleday.
 v. *Connuba*, Hub. (Ochreous, markings not well defined.)
 Adsequa, Tr.
 v. *Prosequa*, Och. (Deep brown, markings well defined.)
 v. *Subsequa*, Curt. (Stigmata united, nervures distinct.)
 v. *Curtisii*, Newman. (Rich chocolate brown, outlines of
 markings pale and distinct.)
 Pronuba, L.
 v. *Innuba*, Tr. - (The unicolorous forms.)

NOCTUA, L.

Glareosa, Esp.
 Depuncta, L.
 Augur, Fab.
 Plecta, L.
 Flammatra, Fb. (?)
 C-Nigrum, L.
 v. *Nun-atrum*, Esp.
 Ditrapezium, Hub.
 Triangulum, Och.

Rhomboidea, Tr. 1825. (This is usually quoted as *Rhomboidea*, *Stigmatica*, Hb. 1793-1827. Esp., but Guenée and Staudinger agree that Espers' insect is *Triangulum*.)

Brunnea, W.V.

Festiva, W.V.

v. *Subrufa*, Haw. (Reddish, no black dash between the stigmata.)

v. *Congener*, Hub. (Warmer red, lines indistinct.)

Conflua, Tr. (? Northern moorland form of *Festiva*.)

Dahlia, Hub.

Subrosea, Steph.

Rubi, View. 1790.

Doubleday. Staudinger.

Bella, Bork. 1792.

Berce.

Umbrosa, Hb.

Baja, W.V.

Sobrina, Bdv.

Castanea, Esp.

v. *Neglecta*, Hb. (The type is reddish, the var. grey.)

Xanthographa, Fab.

rthosidæ, Gn.

TRACHEA, Och.

Piniperda, Kob.

PACHNOBIA, Gn.

Hyperborea, Zett. 1840.

Alpina, West. 1841-4.

v. *Carnica*, Hering, 1846. (Reddish, not grey. This form was named before the variation of the species was well known.)

TÆNIOCAMPA, Gn.

Gothica, L.

v. *Gothicina*, H.S. (Without the black mark between the stigmata.)

Leucographa, W.V.

Rubricosa, W.V.

v. *Mista*, Hub. ? (Guenée considers the type those in which grey predominates. The varieties are redder, *Rufa* has a rosy fringe to the

v. *Rufa*, Haw. *h.w.* as in the type.)

Instabilis, Roes. 1746-61. (Brownish red, nearly unicolorous.)

Incerta, Hufn. 1767. Staudinger. [Berce. Doubleday.]

- v. *Fuscatus*, Haw. (Darker brown.)
- v. *Nebulosus*, Haw. (Distinct central shade, broken in middle.)
- v. *Collinita*, Esp. (Grey, with a reddish tinge.)
- Sulcetaceus*, Haw.

Opima, Hub.

Stabilis, Albin.

- v. *Juncta*, Haw. (The stigmata close together.)

Gracilis, W.V.

- v. *Pallida*, Steph. (Without scattered black scales.)

Miniosa, W.V.

Munda, W.V.

- v. *Immaculata*, Std. Cat. (Without black spots near hind margin.)

Cruda, W.V. 1776.

Berce. Doubleday.

Pulverulenta, Esp. 1787.

Staudinger.

ORTHOZIA, Esp. 1787.

Suspecta, Hub.

- v. *Congener*, Gey. (Greyer, and more unicolorous.)
- Iners*, Tr.

Ypsilon, W.V.

Lota, L.

Macilenta, Hb.

ANCHOCELIS, Gn.

Rufina, L.

Pistacina, W.V.

- v. *Lychnides*, W.V. (Ferruginous, nervures distinctly paler.)
- Lineola*, Don.

- v. *Canaria*, Esp. (Greyish-black, nervures distinctly paler.)

- v. *Rubetra*, Esp. (Reddish, nearly unicolorous.)
- Ferrea*, Haw.

- v. *Serina*, Esp. (Pale yellow-ochreous, nearly unicolorous.)

Lunosa, Haw.

Litura, L.

- v. *Polluta*, Esp. (Larger, costal spots large and distinct.)

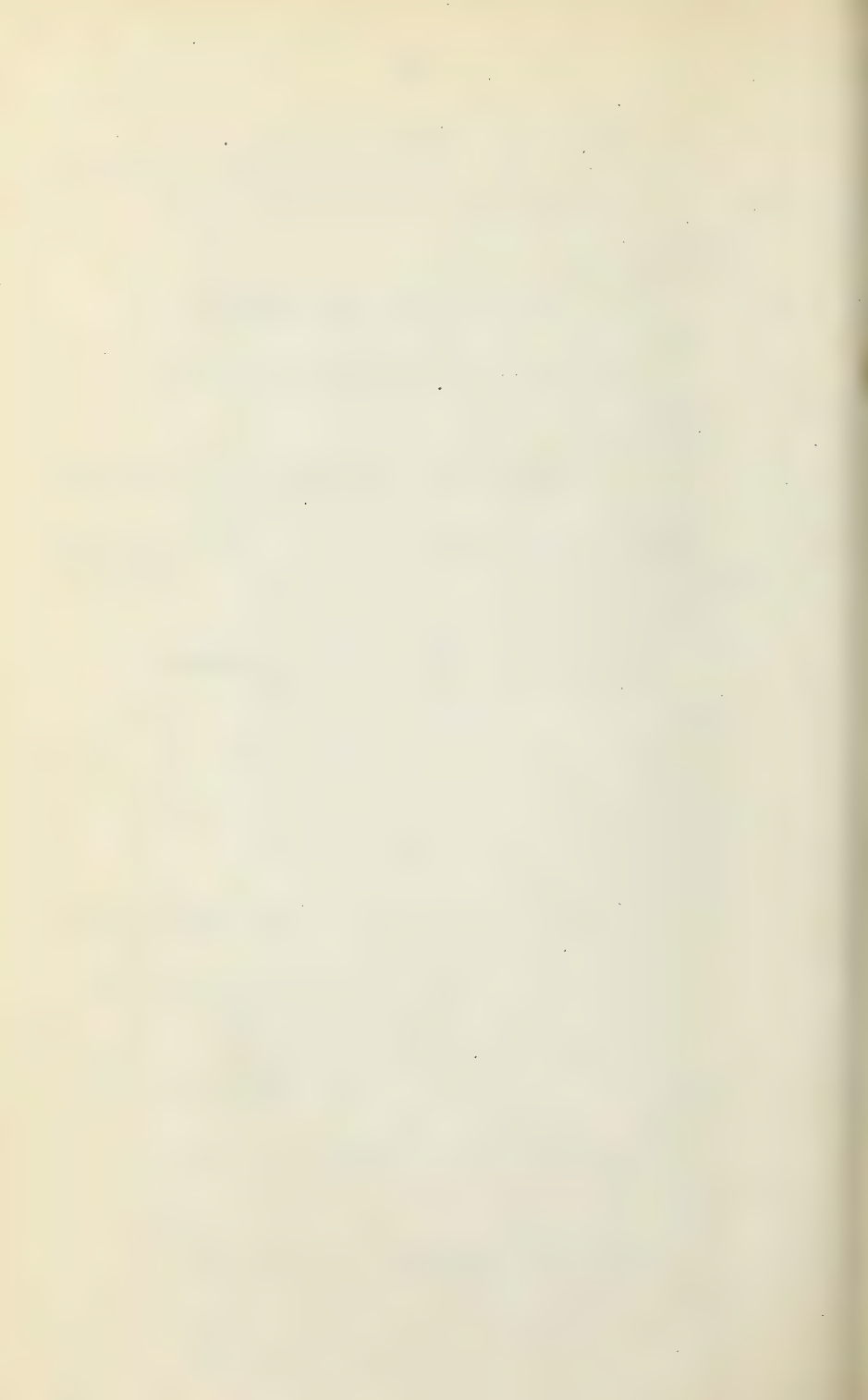
CERASTIS, Och.

Vaccinii, L.

- v. *Polita*, W.V. (Unicolorous, ferruginous red.)

Spadicea, W.V.

- v. *Ligula*, Esp.
- Subnigra*, Haw.



Erythrocephala, W.V.

v. *Glabra*, W.V.

SCOPELOSOMA, Curt.

Satellitica, L.

DASYCAMPA, Gn.

Rubiginea, W.V.

HOPORINA, Bdv.

Croceago, Albin.

XANTHIA, Och.

Citrago, L.

Cerago, W.V.

v. *Flavescens*, Esp. (Yellow, without darker markings.)

Gilvago, Haw.

Silago, Hub. 1800.

Berce, Doubleday.

Flavago, Fab. 1787.

Staudinger.

Aurago, W.V.

v. *Fucata*, Esp. (Centre of wing reddish orange.)

Rutilago, Bork.

Gilvago, Esp.

Ferruginea, W.V. 1776.

Berce. Doubleday.

Circellaris, Hufn. 1767.

Staudinger.

CIRRHEDIA, Gn.

Xerampelina, Hb.

v. *Unicolor*, Std. Cat. (The entire wings reddish orange.)

Cosmidæ, Gn. *

TETHEA, Och.

Subtusa, W.V.

Retusa, L.

EUPERIA, Gn.

Fulvago, W.V.

DICYCLA, Gn.

Oo, L.

v. *Renago*, Haw. (Wings deeply suffused.)

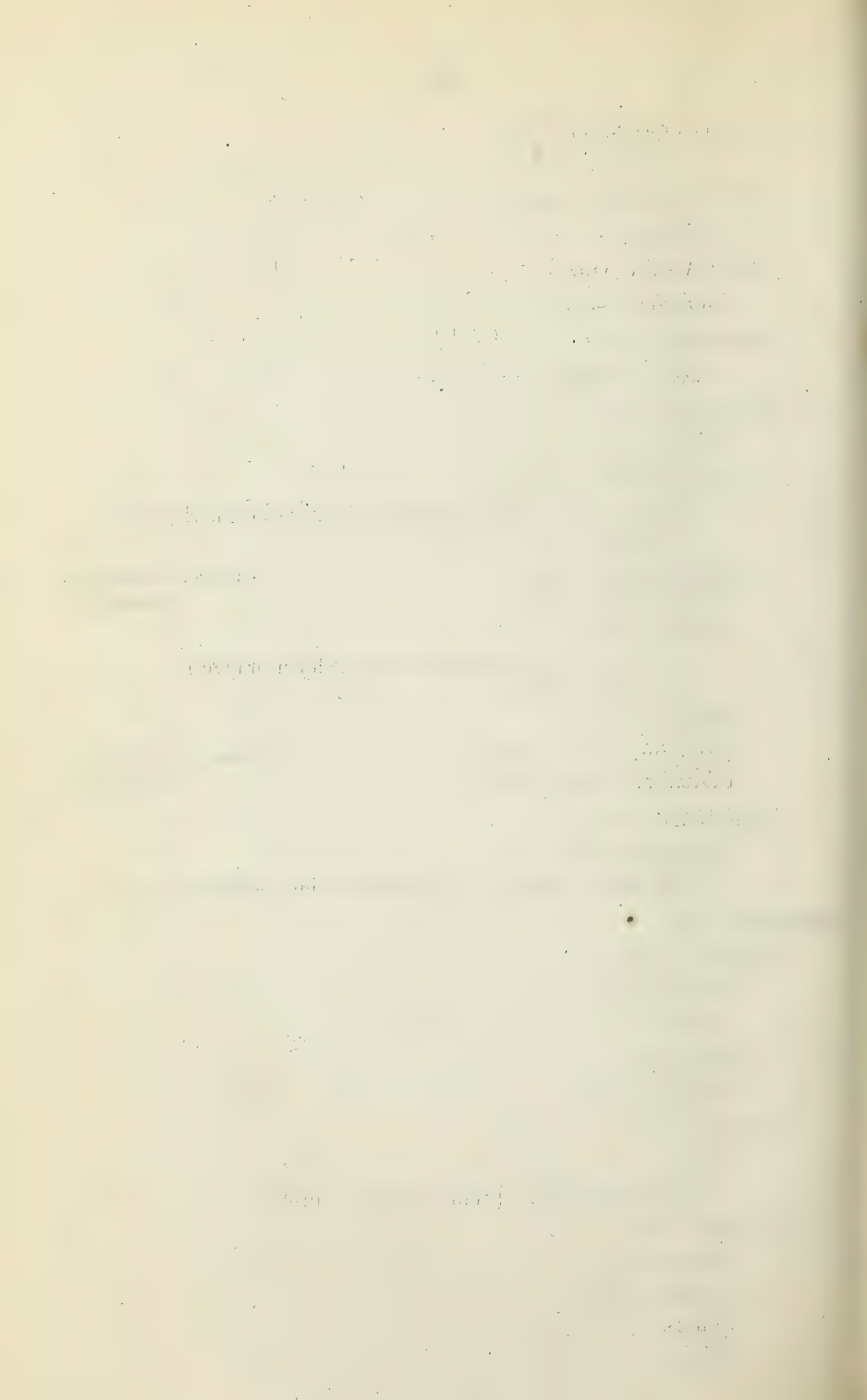
COSMIA, Och.

Trapezina, L.

Pyralina, W.V.

Diffinis, L.

Affinis, L.



Hadenidæ, Gn.

EREMOBIA, Steph.

Ochroleuca, W.V.

DIANTHÆCIA,

Irregularis, Hufn.

Carpophaga, Bork.

v. *Ochracea*, Haw. (Paler, and with few or no dark blotches.)

Capsophila, Dup. ? Præc. var.

Capsincola, W.V.

Cucubali, W.V.

Albimacula, Bork.

Conspersa, W.V.

v. *Obliteræ*. (The entire wing suffused with the darker colour.)

*Cæsia, W.V.

v. *Manani*, Gregson. (Nearly unicolorous.)

HECATERA, Gn.

Dysodea, W.V. 1776.

Berce. Doubleday.

Chrysozona, Bork. 1792.

Staudinger.

Serena, W.V.

POLIA, Och.

Chi, L.

v. *Olivacea*, Steph. (Dark olive green.)

* Nigrocincta, Och. 1807-16.

Berce.

Xanthomista, Hb. 1818. (?)

Doubleday. Staudinger.

v. *Siatices*, Gregson. 1869. (Darker, ground colour and hind wings.)

Flavocincta, L.

DASYPOLIA, Gn.

Templi, Thunb.

EPUNDA, Dup.

Lutulenta, W.V.

v. *Lunebergensis*, Frr. (Central band edged with white.)v. *Sedi*, Bdv.

Nigra, Haw.

Viminalis, Fab.

v. *Obscura*, Std. Cat. (Much darker, often nearly black.)

Lichenea, Hb.

VALERIA, Germ.

Oleagina, W.V. ? (One specimen in July, 1800.)

MISELIA, Och.

Oxyacanthæ, Albin.

v. *Capucina*, Mill. (Brown, nearly unicolorous.)*Bimaculosa*, L. ? (One in 1815, near Bristol.)

AGRIOPIS, Bdv.

Aprilina, L.

PHLOGOPHORA, Och.

Meticulosa, L.*Empyrea*, Hb. 1799.

Berce. Doubleday.

Flammea, Esp. 1785.

Staudinger.

EUPLEXIA, Steph.

Lucipara, L.

APLECTA, Gn.

Herbida, W.V.*Occulta*, L.v. *Æthiops*. (Black, lines and margin of stigmata greyish.)*Nebulosa*, Hufn.*Tincta*, Brahm.*Advena*, W.V.

HADENA, Och.

Satura, W. ? (A few specimens only have been taken.)*Adusta*, Esp.*Protea*, W.V.*Glauca*, Kleem.v. *Lappa*, Dup. (Smaller, more ash-coloured.)*Dentina*, W.V.v. *Latenai*, Pier. (Markings obscured.)*Peregrina*, Tr. ? (Two specimens in the Isle of Wight; one in the fens.)*Chenopodii*, Albin, 1720.

Berce. Doubleday.

Trifolii, Hufn. 1767.

Staudinger.

Atriplicis, L.*Suasa*, W.V. 1776.

Berce. Doubleday.

Dissimilis, Knock. 1781.

Staudinger.

Oleracea, L.*Pisi*, L.*Thalassina*, Naturf.*Contigua*, W.V.

Genistæ, Bork. 1792.
W-Latinum, Hufn. ♀ 1767.
 Rectilinea, Esp.

Doubleday. Staudinger.
 Berce. Stainton.

Xylinidæ, Gn.

XYLOCAMPA, Gn.
 Lithoriza, Bork.

CLOANTHA, Bdv.
 Perspicillaris, L. 1761.
Polyodon, Clerk, 1759.
 Solidaginis, Hb.

Berce. Doubleday.
 Staudinger.

CALOCAMPA, Steph.
 Vetusta, Hb.
 Exoleta, L.

XYLINA, Och.

Conformis, W.V. 1776.
Furcifera, Hufn. 1767.
 Lambda, Fab.
 v. *Zinckenii*, Tr.
 Rhizolitha, Fab. 1787.
Ornithopus, Hufn. 1767.
 Semibrunnea, Haw.
 Petrificata, W.V.

Berce.
 Doubleday Sup. Staudinger.

Berce. Doubleday.
 Staudinger.

CUCULLIA, Och.

Verbasci, L.
 Scrophulariæ, W.V.
 Lychnitis, Ramb.
 Asteris, W.V.
 Gnaphalii, Hb.
 Absinthii, L.
 Chamomillæ, W.V.
 Umbratica, L.

Helioididæ, Gn.

HELIOTHIS, Och.
 Marginata, Kleem. 1761.
Umbra, Hufn. 1767.
 Peltigera, W.V.
 Armigera, Hb.
 Dipsacea, L.
 Scutosa, W.V.

Berce. Doubleday.
 Staudinger.

ANARTA, Och.

Melanopa, Thunb.

Cordigera, Thunb.

Myrtilli, L.

HELIODES, Gn.

Arbuti, Fab. 1775.

Tenebrata, Scop, 1763.Berce. Doubleday.
Staudinger.**Acontidæ**, Bdv.**AGROPHILA**, Bdv.

Sulphuralis, L. 1766.

Trabealis, Scop. 1763.Berce. Doubleday.
Staudinger.**ACONTIA**, Och.

Luctuosa, W.V.

Solaris, W.V. ?

Erastridæ, Gn.**ERASTRIA**, Och.

Venustula, Hb.

Fuscula, W.V. 1776.

Fasciana, L. 1761.Berce. Doubleday.
Staudinger.**BANKIA**, Gn.

Argentula, Esp. 1787.

Bankiana, Fab. 1793.Doubleday. Staudinger.
Berce. Stainton.**Anthophilidæ**, Dup.**HYDRELIA**, Gn.

Unca, L.

MICRA, Gn.

Paula, Hb. ?

Parva, Hb.

Ostrina, Hb.

Phalænoidæ, Gn.**BREPHOS**, Och.

Parthenias, L.

Notha, Hb.

Plusidæ, Gn.**ABROSTOLA**, Och.

Urticæ, Hb. post. 1804.

Tripartita, Hufn. 1767.*Triplasia*, L.Berce. Doubleday.
Staudinger.

PLUSIA, Och.

Orichalcea, Fab. 1775.

Chryson, Esp. 1789.

Chrysitis, L.

Bractea, W.V.

Festucæ, L.

Iota, L.

V-Aureum, Erg. 1779-92.

Pulchrina, Haw. ? 1810.

Gamma, L.

Ni, Hb ? (Only once recorded.)

Verticillata, Gn. ? (Only once recorded.)

Interrogationis, L.

Berce. Doubleday.
Staudinger.Berce. Doubleday.
Staudinger.**Gonopteridæ, Gn.**

GONOPTERA, Lat.

Libatrix, L.

Amphipyridæ, Gn.

AMPHIPYRA, Och.

Pyramidea, L.

Tragopogonis, L.

MANIA, Tr.

Typica, L.

Maura, L.

Toxocampidæ, Gn.

TOXOCAMPA, Gn.

Craccæ, W.V.

Pastinum, Tr.

Stilbidæ, Gn.

STILBIA, Step.

Anomala, Haw. 1812.

Hybridata, Hb. ? 1814.Doubleday. Staudinger.
Berce.**Catephidæ, Gn.**

CATEPHIA.

Alchymista, Geoff. ? (Only once recorded.)

Catocalidæ, Gn.

CATOCALA, Och.

Fraxini, L.

Nupta, L.
 Promissa, W.V.
 Sponsa, L.

Aventidæ, Gn.

AVENTIA, Dup.
 Flexula, Fab.

Ophiusidæ, Gn.

OPHIODES, Gn
 Lunaris, W.V. ? (Two or three specimens only.)
 EUCLIDIA.
 Mi, L.
 Glyphica, L.

Poaphilidæ, Gn.

PHYTOMETRA, Haw.
 Ænea, W.V.

DELTOIDES, Latr.

Hypenidæ, H.S.

MADOPA, Steph.
 Salicalis, W.V.

HYPENA, Schr.

Proboscidalis, L.
 Rostralis, L.
 v. *Vittatus*, Haw.
 v. *Palpalis*, Fab.

Crassalis, Fab. 1794.
Fontis, Thunb. 1788.

Berce. Doubleday.
 Staudinger.

Obsitalis, Hb. ? (One in Dorsetshire in 1884.)

HYPENODES, Gn.

Albistrigalis, Haw.
 Costæstrigalis, Steph.

SCHRANKIA, H.S.

Turfosalis, Wocke. 1850.
Humidalis, Dbld. 1850.

Herminidæ, Dup.

RIVULA, Gn.
 Sericealis, W.V.

SOPHRONIA, Gn.
Emortualis, W.V.

HERMINIA, Lat.
Derivalis, Hb.
Barbalis, L.
Tarsipennalis, Tr.
Grisealis, W.V.
Cribralis, Hub.

PYRALIDES.

Odontidæ, Gn.

ODONTIA, Dup.
Dentalis, W.V.

Pyralidæ, Gn.

PYRALIS, L.

Fimbrialis, W.V. 1776.

Costalis, Fab. 1775.

Farinalis, L.

Lienigialis, H.S. ? (Only once taken.)

Glaucinalis, L.

Berce. Doubleday.
Staudinger.

AGLOSSA, Lat.
Pinguinalis, L.
Cuprealis, Hb.

Cledeobidæ, Dup.

CLEDEOBIA, Steph.
Angustalis, W.V.

Ennychidæ, Gn.

PYRAUSTA, Schr.

Punicealis, W.V. 1776.

Aurata, Scop. 1763.

Purpuralis, L.

Ostrinalis, Hb.

Berce. Doubleday.
Staudinger.

RHODARIA, Gn.
Sanguinalis, L.

HERBULA, Gn.
Cespitalis, W.V.

ENNYCHIA, Tr.

Cingulalis, L.

Anguinalis, Geoff. 1764.

Nigrata, Scop. 1763.

Octomaculalis, L.

Berce. Doubleday.
Staudinger.

Asopidæ, Gn.

AGROTERA, Schr.

Nemoralis, Scop.

ENDOTRICHA, Zell.

Flammealis, W.V.

Stenidæ, Gn.

DIASEMIA, Steph.

Literalis, Scop.

Ramburialis, Dup.

NASCIA, Curt.

Cilialis, Hub. ? 1827-41.

Acutalis, Evers. 1842.

Berce. Doubleday.
Staudinger.

STENIA, Gn.

Punctalis, W.V.

Hydrocampidæ, Gn.

CATACLYSTA, H.S.

Lemnalis, L.

PARAPONYX, Steph.

Stratiotalis, L.

HYDROCAMPA, Lat.

Nymphæalis, L.

Stagnalis, Don.

Acentropidæ, Strd.

ACENTROPUS, Curt.

Niveus, Oliv.

Margarodidæ, Gn.

MARGARODES, Gn.

Unionalis, Hb.

Botydæ, Gn.

BOTYS, Lat.

Lupulinalis, Cl. 1764.

Nubilalis, Hub. 1793-1827.

Pandalis, Hub.

Berce. Doubleday.
Staudinger.

- Lupulinalis, Cl. 1759. Berce. Doubleday.
Nubilalis, Hub. 1793-1827. Staudinger.
 Pandalis, Hub.
 Flavalis, W.V.
 Hyalinalis, Hub.
 Verticalis, W.V. 1776. Berce. Doubleday.
Ruralis, Scop. 1763. Staudinger.
 Lancealis, W.V.
 Fuscalis, W.V.
 Terrealis, Tr.
 Asinalis, Hub.
 Urticalis, L.
- EBULEA, Gn.**
 Crocealis, Tr.
 Catalaunalis, Dup. (? One only.)
 Verbascalis, W.V.
 Stachydalis, Zinck.
 Sambucalis, W.V.
- PIONEA, Gn.**
 Forficalis, L.
 Margaritalis, W.V. 1776. Berce. Doubleday.
Extimalis, Scop. 1763. Staudinger.
 Stramentalis, Hub.
- SPILODES, Gn.**
 Sticticalis, L.
 Palealis, W.V.
 Cinctalis, Tr.
- SCOPULA, Schr.**
 Alpinalis, W.V.
 Lutealis, Haw.
 Decreptalis, H.S.
 Olivalis, W.V.
 Prunalis, W.V.
 Ferrugalis, Hub.
- LEMIODES, Gn.**
 Pulveralis, Hb.
- MECYNA, Gn.**
 Polygonalis, Hub.

Scopariidæ, Gn.

STENOPTERYX, Gn.

Hybridalis, Hub.

SCOPARIA, Haw.

EUDOREA, Curt.

Basistrigalis, Knaggs.

Ambigualis, Tr.

Atomalis, Dbl. (? præc. var.)

Cembræ, Haw.

v. *Scotica*, White.

Zelleri, Wocke. (? præc. var.)

Ulmella, Dale.

Conspicualis, Hodg. (? identical with *Ulmella*.)

Pyrallalis, W.V. 1776.

Berce. Doubleday.

Dubitalis, Hub. 1793-1827.

Wocke.

Ingratella, Zell. (? præc. var.)

Truncicolella, Sta.

Mercurialis, L.

Portlandica, Dale.

Cratægalis, Hub.

Resinea, Haw.

Muralis, Curt.

Gracilalis, Dbl.

Lineola, Curt.

Angustea, Steph.

Wocke.

Coarctalis, Zell.

Berce. Doubleday.

Alpina, Dale.

Wocke.

Paralis, Zell.

Berce. Doubleday.

Pallida, Steph.

GEOMETRÆ.**Urapteryidæ, Gn.**

URAPTERYX, Leach.

Sambucata, L.

Ennomidæ, Gn.

EPIONE, Dup.

Vespertaria, L.

Apiciaria, W.V.

Advenaria, Hub.

RUMIA, Dup.

Cratægata, L. (Ed. XII. 1761.)

Berce. Doubleday.

Luteolata, L. (Ed. X. 1758.)

Staudinger.

VENILIA, Dup.

Maculata, L.

v. *Quadrinaculata*, Hatchett. (All yellow, except four costal spots.)v. *Fuscaria*, Std. Cat. (Fuscous.)

ANGERONA, Dup.

Prunaria, L.

v. *Sordidata*, Fuesl. (Dark borders to wings.)

METROCAMPA, Latr.

Margaritata, L.

ELLOPIA,

Fasciaria, L. (Ed. XII. 1761.)

Berce. Doubleday.

Prosapiaria, L. (Ed. X. 1758.)

Staudinger.

v. *Prasinaria*, W.V. (Green.)

EURYMENE, Dup.

Dolabraria, L.

PERICALLIA, Steph.

Syringaria, L.

v. *Helvolaria*. (Smaller, paler. The summer brood.)

SELENIA, Hb.

Illunaria, Albin, 1720.

Bilunaria, Esp., 1794.v. *Juliaria*, Haw. (Smaller, paler. The summer brood.)

Lunaria, Albin.

v. *Delunaria*, Hub. (Smaller, paler. The summer brood.)

Illustraria, Albin, 1720.

Tetralunaria, Hufn., 1767.v. *Æstiva*, Std. Cat. (Smaller, paler. The summer brood.)

ODONTOPERA, Steph.

Bidentata, L.

CROCALLIS, Tr.

Elinguaria, Albin.

v. *Prosapiaria*, Boisd. (Smaller, paler, central fascia indistinct.)

ENNOMOS, Tr.

Autumnaria, Wernb., 1859.

Alniaria, Esp. (Non. L.)

Alniaria, L.

Tiliaria, Bork.

Fuscantaria, Haw.

Erosaria, W.V.

Angularia, W.V. 1776.

Berce. Doubleday.
Staudinger.

Quercinaria, Hufn. 1767.

HIMERA, Dup.

Pennaria, Albin.

Amphydasydæ, Gn.

PHIGALIA, Dup.

Pilosaria, Albin.

NYSSIA, Dup.

Zonaria, W.V.

Hispidaria, W.V.

Lapponaria, Bdv. ? (One specimen only.)

BISTON, Leach.

Hirtaria, L.

AMPHYDASIS, Tr.

Prodromaria, W.V. 1776.

Berce. Doubleday.
Staudinger.

Strataria, Hufn. 1767.

Betularia, L.

v. *Doubledayaria*, Mill. (All black.)

Boarmidæ, Gn.

HEMEROPHILA, Steph.

Abruptaria, Thun.

CLEORA, Curt.

Viduaria, W.V. 1776.

Berce. Doubleday.
Staudinger.

Angularia, Thun. 1792.

Glabraria, Hb.

Lichenaria, Hufn.

BOARMIA, Tr.

Repandata, L.

v. *Conversaria*, Hb. (Broad dark band across wings.)

v. *Destrigaria*, Haw. (Nearly unicolorous.)

v. *Sodorensium*, Weir. (Leaden grey.)

Rhomboidaria, W.V.

Gemmaria, Brahm.

v. *Perfumaria*, Newm. (Darker, more unicolorous.)

Abietaria, W.V.

v. *Sericearia*, Curt. (More suffused.)

Cinctaria, W.V.

Roboraria, W.V.

Consortaria, Fab.

TEPHROSIA, Bdv.

Consonaria, Hub.

Crepuscularia, W.V. 1776.

Laricaria, Dbld. 1848.

Stainton's Manual.

Biundularia, Bkh. 1794.

Crepuscularia, Haw.

Stainton's Manual.

Extersaria, Hub. 1797.

Berce. Doubleday.

Luridata, Bork, 1794.

Staudinger.

Punctulata, W.V.

GNOPHOS, Tr.

Obscurata, W.V.

v. *Serotinaria*, W.V. (From chalk districts. Very pale.)

v. *Calceata*, Std. Cat. (From peat districts. Nearly black.)

v. *Dilucidaria*, Steph. (From clay or sand districts. Brown.)

Argillacearia, Std. Cat.

Staudinger.

Pullata, Hub.

Stainton's Manual.

DASYDIA, Gn.

Obfuscata, W.V.

PSODOS, Tr.

Trepidaria, Hb.

Coracina, Esp. 1796.

Boletobidæ, Gn.

BOLETOBIA, Bdv.

Fuliginaria, L.

Geometridæ, Gn.

PSEUDOPTERPNA, Hb.

Cytisaria, Roes, 1749-61.

Pruinata, Hufn, 1767.

GEOMETRA, L.

Papilionaria, L.

Smaragdaria, Hub.

NEMORIA, Hub.

Viridata, L.

IODIS, Hub.

Vernaria, Hub.

Lactearia, L.

PHORODESMA, Bdv.

Bajularia, W.V. 1776.

Pustulata, Hufn. 1767.Berce. Doubleday.
Staudinger.

HEMITHEA, Dup.

Thymiaria, Albin. 1720.

Strigata, Muell. 1764.Berce. Doubleday.
Staudinger.**Ephyridæ, Gn.**

EPHYRA, Dup.

Porata, L.

Punctaria, L.

Trilineararia, Bkh. 1794.

Linearia, Hb., 1793-1824.Berce. Doubleday.
Staudinger.

Omicronaria, W.V. 1776.

Annulata, Schulze, 1779.Berce. Doubleday.
Staudinger.

Orbicularia, Hub.

Pendularia, L. 1746. (Cl. 1759.)

Acidalidæ, Gn.

HYRIA, Steph.

Auroraria, W.V. 1776.

Muricata, Hufn. 1769.Berce. Doubleday.
Staudinger.

ASTHENA, Hub.

Luteata, W.V.

Candidata, W.V.

Sylvata, W.V.

Blomeri, Curt.

EUPISTERIA, Bdv.

Heparata, W.V. 1776.

Obliterata, Hufn. 1767.Berce. Doubleday.
Staudinger.

VENUSIA, Curt.

Cambrica, Curt. 1839.

Erutaria, Bdv. 1840.

ACIDALIA, Tr.

Perochraria, Fisch.

Ochrata, Scop.

Rotundaria, Haw.

Exanthemaria, Scop.

CORYCIA, Dup.

Temerata, W.V.

Taminata, W.V. 1776.

Bimaculata, Fab. 1775.

ALEUCIS, Cn.

Pictaria, Curt.

Macaridæ, Gn.

MACARIA, Curt.

Alternata, W.V.

Notata, L.

Liturata, L.

HALIA, Dup.

Wavaria, L.

Fidonidæ, Gn.

STRENIA, Dup.

Clathrata, L.

PANAGRA, Gn.

Petraria, Hub.

NUMERIA, Dup.

Pulveraria, L.

SCODIONA, Bdv.

Belgiaria, Hub.

SELIDOSEMA, Bdv.

Plumaria, W.V. 1776.

Ericetaria, Vill. 1789.

FIDONIA, Tr.

Carbonaria, L.

Atomaria, L.

Piniaria, L.

v. *Flavescens*, White.

Brunneata, Thunb. 1794.

Pinetaria, Hub.

Limbaria, Fab. 1775.

Conspicuata, W.V. 1776.

MINOA, Tr.

Euphorbiata, W.V. 1776.
Murinata, St. 1763.

Berce. Doubleday.
 Staudinger.

SCORIA, Steph.

Dealbata, L. 1767.
Lineata, Scop. 1763.

Berce. Doubleday.
 Staudinger.

APLASTA, Hb.

Ononaria, Fues. (A very doubtful British species.)

STERRHA, Hb.

Sacraria, L.

LYTHRIA, Hub.

Purpuraria, L. (A very doubtful British species.)

ASPILATES, Tr.

Strigillaria, Hub.

Citraria, Hub. post. 1797.
Ochrearea, Roes. 1794.

Berce. Doubleday.
 Staudinger.

Gilvaria, W.V.

Lorenidæ, Gn.

ABRAXAS, Leach.

Grossulariata, L.

v. *Varleyata*, Porritt. (Almost entirely black.)

Ulmata, Sepp.
Sylvata, Scop. 1763.

Berce. Doubleday.
 Staudinger.

LIGDIA, Gn.

Adustata, W.V.

LOMASPILIS, Hub.

Marginata, L.

Ligidæ, Gn.

PACHYCNEMIA, Steph.

Hippocastanaria, Hb.

Hybernidæ, Gn.

HYBERNIA, Lat.

Rupicapraria, W.V.

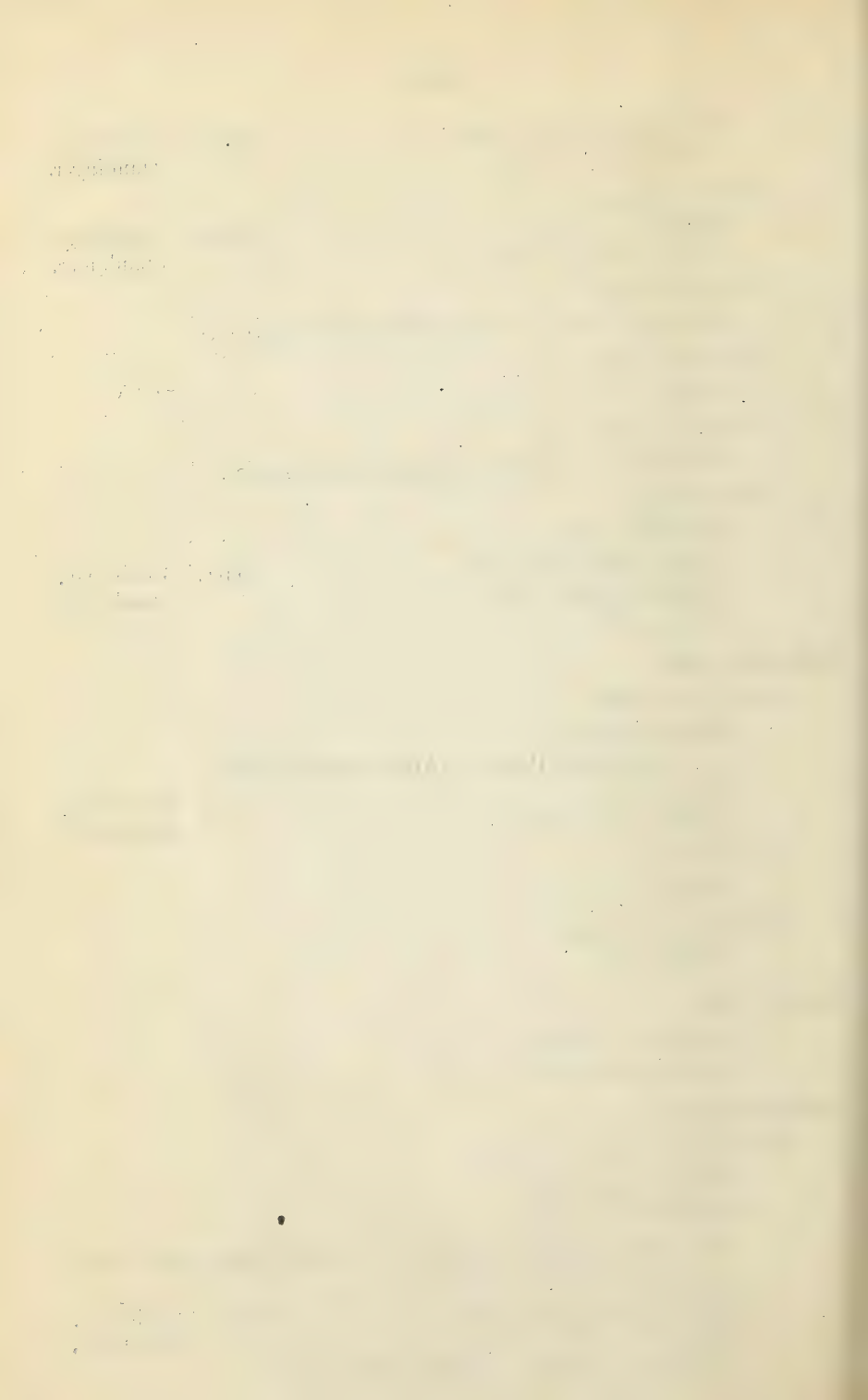
Leucophearria, W.V.

v. *Marmorinaria*, Esp. 1795 ? (Base and hind margin black)
Nigricaria, Haw. 1800. ?

Progemmaria, Albin, 1720.
Marginaria, Bkh. 1794.

Berce. Doubleday.
 Staudinger.

v. *fuscata*, Mosley. (Dark, unicolorous.)



Defoliaria, L.

ANISOPTERYX, Steph.

Æscularia, W.V.

Larentidæ Gn.

CHEIMATOBIA, Steph.

Brumata, L.

Boreata,

OPORABIA, Steph.

Dilutata, W.V.

v. *Obscurata*, Std. Cat. (Dark, unicolorous.)

Filigrammaria, H.S.

Autumnaria, Gn.

Approximaria, Weaver. (Gregson, MS.)

LARENTIA, Tr.

Didymata, L.

Multistrigaria, Haw.

Cæsiata, W.V.

Flavicinctata, Hub.

Ruficinctata, Gn.

Salicata, Hub.

Olivata, W.V.

Pectinitaria, Knoch. 1781.

Berce. Doubleday.

Miaria, Bork. 1794.

Stainton.

Viridaria, Fab. 1775.

Staudinger.

EMMELESIA, Steph.

Affinitata, Steph.

v. *Turbaria*, Steph. (Broader white streak—"rivulet.")

Alchemillata, L.

Albulata, W.V.

v. *Griseata*, Std. Cat. (Greyish.)

All more or less with-

v. *Thules*, Weir. (Lead-coloured.)

out markings.

v. *Hebrideum*, Weir. (White.)

Decolorata, Hub.

Tæniata, Steph.

Unifasciata, Haw.

Ericetata, Curt. (Steph. 1831.)

Berce. Doubleday.

Minorata, Tr. 1828.

Staudinger.

Blandiata, W.V., 1776.

EUPITHECIA, Curt.

- Venosata, Fab.
 v. *Ochracæ*, Gregson. (Ochreous.) Hoy, Orkney.
 v. *Fumoseæ*, Gregson. (Smoky.) Unst, Shetland.
- Consignata, Bork, 1794. Berce. Doubleday.
Insigniata, Hub. 1792. Staudinger.
- Linariata, W.V.
- Pulchellata, Steph.
- Centaureata, W.V. 1776. Berce. Doubleday.
Oblongata, Thub. 1784. Staudinger.
- Succenturiata, L.
 v. *Disparata*, Hub. (Darker in central portion of wing.)
- Subfulvata, Haw.
 v. *Oxydata*, Tr. 1828. (Without the red patch in centre of
Cognata, Steph, 1831. wing.)
- Subumbrata, W.V. 1776. Berce. Doubleday.
Scabiceata, Bkh. 1794. Staudinger.
- Plumbeolata, Haw.
- Isogrammata, H.S. 1850. Doubleday. Staudinger.
Haworthiata, Dbl. Stainton.
- Pygmæata, Hb.
- Helveticaria, Bdv.
- Arceuthata, Fr. ? præc. var.
- Satyrata, Hub.
 v. *Fagicoloria*, Crewe. (Brown.)
 v. *Callunaria*, Staud. (Ashy white.)
- Curzoni, Gregson.
- Castigata, Hb.
- Jasioneata, Crewe.
- Trisignaria, H.S.
- Virgaureata, Dbl.
- Pimpinellata*, Gn. (Non. Hub.) 1857.
- Fraxinata, Crewe.
- Extensaria, Fr.
- Pimpinellata, Hub. 1793-1827. Berce. Doubleday. Staudinger.
Denotata, Gn. (Non. Hub.) 1857. Stainton.
- Valerianata, Hub., ante 1827. Doubleday sup. Staudinger.
Viminata, Dbl. *Entomologists Annual*, 1863.
- Pusillata, W.V.
- Irriguata, Hub.

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LABEL LIST OF BRITISH LEPIDOPTERA.

The following list is based upon that issued by the late Henry Doubleday, and the order of that list is followed. This is not intended to imply unqualified approval of the Doubleday arrangement, but it is in general use in Britain, and it is very undesirable to attempt any alteration until an arrangement can be given with the authority of the several entomological societies, or of some person or persons, of sufficient eminence to be accepted as an authority. The present list makes no pretence to be anything but a compilation, and is only offered to entomologists for their convenience, until a more satisfactory one is obtainable. I have used my own judgement as to what species should be included or omitted. To have given all that have been proposed, would have hindered rather than helped beginners, and old hands are as able to judge as I am. If I have erred it will be on the side of omission.

Where the Doubleday name seems to have been properly superseded by another, I give both, with the Doubleday name below. Where another name appears to have been improperly substituted, I give both, with the Doubleday name above. In these cases I am responsible for deciding which name should have priority, and may expect opinions to differ, but as I give both names no harm can result if I err. Further than this I give no synonymy, as the list is intended for collectors, not students.

I have had some difficulty in deciding what to do with named varieties. No rule has ever been suggested as to what should constitute a form sufficiently distinct to merit a distinguishing name, and writers have differed considerably in naming them. Some very distinct forms, such as *Filipendula* with yellow spots and hind wings, have never been named; while others have been so distinguished from a single aberration. Some hold that no variety should be named where intermediate forms obtain, but with this I cannot agree. The rare intermediate forms in many cases prove the commoner variety to be truly deserving distinction. I have endeavoured to include those names that have been applied to local races, as well as those applied to forms that occur with the type with more or less regularity. I will be obliged for comments and criticisms on this, as well as on other portions of the list, so that I may be able to improve upon it if another edition be ever required.

The few cases where the named type does not occur here, but the variety does, are distinguished by an asterick.

There are also a few species that have occurred singly, or nearly so, but under circumstances that do not seem to admit of their being importations. These with a few of more or less doubtful distinctness I have endeavoured to distinguish by ?

The few species known, or believed to have been indigenous, but that no longer occur here are included within brackets.

JOHN E. ROBSON.

DIURNI.

Papilionidæ, Gn.PAPILIO, *L.**Machaon, L.***Pieridæ, Gn.**LEUCOPHASIA, *Steph.**Sinapis, L.*v. (g. i.) *Lathyri, Hb.*v. (g. ii.) *Diniensis, Bdv.*v. *Erysimi, Bork.*PIERIS, *Schr.**Cratægi, L.**Brassicæ, L.**Rapæ, L.**Napi, L.**Daplidice, L.*ANTHOCARIS, *Bdv.**Cardamines, L.***Rhodoceridæ, Gn.**GONEPTERYX, *Leach.**Rhamni, L.*COLIAS, *Bdv.**Crocus, Fourcroy.*
*Edusa, Fab.*v. *Helice, Hb.**Hyale, L.*v. *Pallida.***Vanessidæ, Gn.**ARGYNNIS, *Och.**Paphia, L.*v. *Valezina, Esp.**Aglaia, L.**Adippe, L.**Lathonia, L.**Euphrosyne, L.**Selene, L.*MELITÆA, *Fab.**Aurinia, Rott.**Artemis, Fab.*v. *Hibernica, Birchall.*v. *Scotica, White.**Cinxia, L.**Athalia, Rott.*VANESSA, *Och.**C-album, L.*v. (g. i.) *Hutchinsoni.**Urticæ, L.**Polychloros, L.**Antiopa, L.*v. *Hygiæa, Hdrch.**Io, L.**Atalanta, L.**Cardui, L.***Nymphalidæ, Gn.**LIMENITIS, *Bdv.**Sibylla, L.*APATURA, *Och.**Iris, L.*v. *Iole, W.V.***Satyridæ, Gn.**ARGE, *Esp.**Galathea, L.*EREBIA, *Bdv.**Epiphron, Knock.*v. *Cassiope, Fab.**Medea, W.V.**Æthiops, Esp.*SATYRUS, *Bdv.**Ægeria, L.**Megæra, L.**Semele, L.**Janira, L.**Tithonus, L.**Hyperanthus, L.*CHORTOBIUS, *Gn.**Davus, Fab.*v. *Laidion, Bkh.**Typhon, Haw.*v. *Philoxenus, Esp.**Rothliebii, Std. Cat.*v. *Isis, Thub. (?)**Pamphilus, L.*v. *Lyllus, Esp.***Lycænidæ, Gn.**THECLA, *Fab.**Rubi, L.**Quercus, L.**W-album, L.**Pruni, L.**Betulæ, L.*POLYOMMATUS, *Bdv.*[*Dispar, Haw.*
Hippothoe, L.]*Phlæas, L.*LYCÆNA, *Tr.**Ægon, W.V.**Argyrotoxis, Bgstr.**Agestis, W.V.**Astrarche, Bgstr.**Medon, Esp.**Icarus, Rott.**Alexis, W.V.*v. *Icarinus, Scriba.**Bellargus, Rott.**Adonis, W.V.**Corydon, Fab.**Semiargus, Rott.**Acis, W.V.*

Minima, *Rott.*
 Alsus, *W.V.*

Argiolus, *L.*

Arion, *L.*

Erycinidæ, Gn.

NEMEOBIUS, *Steph.*

Lucina, *L.*

Hesperidæ, Gn.

SYRICTHUS, *Bdv.*

Malvæ, *L.*
 Alveolus, *Hb.*

v. *Fritillum, W.V.*
Tarus, Bergst.

THANAOS, *Bdv.*

Tages, *L.*

HESPERIA, *Bdv.*

Palæmon, *Pall.*
 Paniscus, *Fab.*

Sylvanus, *Esp.*

Comma, *L.*

Linea, *W.V.*
 Thaumias, *Hufn.*

Actæon, *Esp.*

NOCTURNI.

SPHINGES AND BOMBYCES OF LINNEUS.

Sphingidæ, Gn.

SMERINTHUS, *Lat.*

Ocellatus, *L.*

Hybridus, Std. Cat.

Populi, *L.*

Tiliæ, *L.*

ACHERONTIA, *Och.*

Atropos, *L.*

SPHINX, *L.*

Convolvuli, *L.*

Ligustri, *L.*

DEILEPHILA, *Och.*

[*Euphorbiæ, L.*]

Galii, *W.V.*

Lineata, *Fab.*

Livornica, *Esp.*

CHÆROCAMPA, *Dup.*

Celerio, *L.*

Porcellus, *L.*

Elpenor, *L.*

Nerii, *L.*

MACROGLOSSA, *Och.*

Stellatarum, *L.*

Fuciformis, *L.*

Bombylifformis, *Esp.*

Bombylifformis, *Och.*

Fuciformis, *Esp.*

Sesidæ, Gn.

SESIA, *Fab.*

Myopiformis, *Borkh.*

Culiciformis, *L.*

Formiciformis, *Esp.*

Chrysidiformis, *Esp.*

Ichneumoniformis, *W.V.*

Asiliformis, *Rott.*
 Cynipiformis, *Esp.*

Tipuliformis, *L.*

Musciformis, *View.*

Andreniformis, *Iasp.*
 Allantiformis, *Wood.*

Scoliiformis, *Hb.*

Spheciformis, *W.V.*
 Sphegiformis, *Fab.*

Tabaniformis, *Rott.*
 Asiliformis, *W.V.*

Crabroniformis, *Lewin.*
 Bembeciformis, *Hb.*

Apiformis, *L.*

Zenzeridæ, Gn.

MACROGASTER, *Dup.*

Castanea, *Hb. 1790.*
 Arundinis, *Hb. 1803.*

ZENZERA, *Lat.*

Æsculi, *L.*
 Pyrina, *L.*

COSSUS, *Fab.*

Cossus, *L.*
 Ligniperda, *Fab.*

Hepialidæ, Gn.

HEPIALUS, *Fab.*

Hectus, *L.*

Lupulinus, *L.*

Sylvinus, *L.*

Velleda, *Hb.*

v. *Carnus, Steph.*
Gallicus, Ld.

Humuli, *L.*

v. *Hethlandica, Knaggs.*

Cochliopidæ, Gn.

LIMACODES, *Lat.*

Asellus, *W.V.*

Limacodes, *Hufn.*
 Testudo, *W.V.*

Procridæ, Gn.

PROCRIS, *Fab.*
 INO, *Leach.*

Geryon, *Hb.*

Statice, *L.*

Globulariæ, *Hb.*

Zygænidæ, Gn.

ZYGÆNA, *Fab.*
 ANTHROCERA, *Steph.*

- *Minos, *W.V.*
v. *Nubigena*, *Ld.*
- *Exulans, *Hock.*
v. *Vanadis*, *Dalm.*
- Meliloti, *Esp.*
- Trifolii, *Esp.*
v. *Confluens*, *Std. Cat.*
- Loniceræ, *Esp.*
- Filipendulæ, *L.*
v. *Chrysanthemi*, *Esp.*
v. *Cytisi*, *Hb.*
- Nolidæ, Gn.**
- NOLA, *Leach.*
- Cucullatella, *L.*
- Confusalis, *H.S.*
Cristulalis, *Dup.*
- Strigula, *W.V.*
- Albulalis, *Hb.*
- Centonalis, *Hb.*
- Lithosidæ, Gn.**
- NUDARIA, *Haw.*
- Senex, *Hb.*
- Mundana, *L.*
- SETINA, *Steph.*
- Irrorella, *L.*
- CALLIGENIA, *Dup.*
- Miniata, *Forst.*
- LITHOSIA, *Fab.*
- Mesomella, *L.*
- Muscerda, *Hb.*
- Griseola, *Hb.*
v. *Stramineola*, *Dbl.*
- Sororcula, *Hufn.*
Aureola, *Hb.*
- Deplana, *Esp.*
Helveola, *Och.*
- Pygmæola, *Dbl.*
- Caniola, *Hb.*
- Lurideola, *Tr.*
Complanula, *Bdv.*
- Sericea, *Gregson.*
Molybdeola, *Gn.*
- Complana, *L.*
- Quadra, *L.*
- Rubricollis, *L.*
- EULEPIA, *Curt.*
EMYDIA, *Bdv.*
[Grammica, *L.*]
- Cribrum, *L.*
- Euchelidæ, Gn.**
- DEIOPEIA, *Curt.*
- Pulchella, *L.*
- EUCHELIA, *Bdv.*
- Jacobææ, *L.*
- CALIMORPHA, *Lat.*
- Dominula, *L.*
- Chelonidæ, Gn.**
- EUTHEMONIA, *Steph.*
- Russula.
- CHELONIA, *Lat.*
ARCTIA, *Steph.*
- Plantaginis, *L.*
v. *Hospita*, *W.V.*
- Caja, *L.*
- Villica, *L.*
- ARCTIA, *Bdv.*
SPILOSOMA, *Curt.*
- Fuliginosa, *L.*
v. *Borealis*, *Std.*
- Mendica, *L.*
- Lubricipeda, *L.*
- Menthastris, *Esp.*
- Urticæ, *Esp.*
- Liparidæ, Gn.**
- LIPARIS, *Och.*
- Chrysorrhæa, *L.*
- Similis, *Fues.*
Auriflua, *W.V.*
- Salicis, *L.*
- Dispar, *L.*
- Monacha, *L.*
- ORGYIA, *Och.*
- Pudibunda, *L.*
- Fascelina, *L.*
- Cænosa, *Hb.*
- Gonostigma, *L.*
- Antiqua, *L.*
- DEMAS, *Steph.*
- Coryli, *L.*
- Bombycidæ.**
- TRICHIURA, *Steph.*
- Cratægi, *L.*
- PÆCILOCAMPA, *Steph.*
- Populi, *L.*
- ERIOGASTER, *Gn.*
- Lanestris, *L.*
- BOMBYX, *L.*
CLISIOCAMPA, *Curt.*
LASIOCAMPA, *Steph.*
- Neustria, *L.*
v. *Bilineatus*, *Haw.*
- Castrensis, *L.*
- Rubi, *L.*
- Quercus, *L.*
v. *Roboris*, *Schrank.*
- Trifolii, *W.V.*
- ODONESTIS, *Germ.*
- Potatoria, *L.*
- LASIOCAMPA, *Lat.*
GASTROPACHA, *Curt.*
- Quercifolia, *L.*
- Ilicifolia, *L.*
- ENDROMIS, *Och.*
- Versicolora, *L.*
- SATURNIA, *Sch.*
- Carpini, *L.*

GEOMETRÆ, Linn.

- Urapterydæ, Gn.**
 OURAPTERYX, *Leach.*
 Sambucata, *L.*
- Ennomidæ, Gn.**
 EPIONE, *Dup.*
 Vespertaria, *L.*
 Apiciaria, *W.V.*
 Advenaria, *Hub.*
 RUMIA, *Dup.*
 Cratægata, *L.*
 VENILIA, *Dup.*
 Maculata, *L.*
 ANGERONA, *Dup.*
 Prunaria, *L.*
 METROCAMPA, *Lat.*
 Margaritata, *L.*
 ELLOPIA, *Tr.*
 Fasciaria, *L.*
 v. *Prasinaria, Hb.*
 EURYMENE, *Dup.*
 Dolobraria, *L.*
 PERICALLIA, *Steph.*
 Syringaria, *L.*
 SELENIA, *Hb.*
 Bilunaria, *Esp.*
 Illunaria, *Hub.*
 v. *Juliaria, Haw. (G. ii.)*
 Lunaria, *W.V.*
 v. *Sublunaria, Steph.*
 v. *Delunaria, Hb. (G. ii.)*
 Tetralunaria, *Hufn.*
 Illustraria, *Hub.*
 v. *Delunaria, St. (G. ii.)*
 ODONTOPERA, *Steph.*
 Bidentata, *L.*
- CROCALLIS, *Tr.*
 Elinguaria, *L.*
 ENNOMOS, *Tr.*
 Autumnaria, *Wernb.*
 Alniaria, *W.V.*
 Alniaria, *L.*
 Tiliaria, *Bkh.*
 Fuscantaria, *Haw.*
 Erosaria, *W.V.*
 Quercinaria, *Hufn.*
 Angularia, *W.V.*
 HIMERA, *Dup.*
 Pennaria, *L.*
- Amphydasydæ, Gn.**
 PHIGALIA, *Dup.*
 Pilosaria, *W.V.*
 NYSSIA, *Dup.*
 Zonaria, *W.V.*
 Hispidaria, *W.V.*
 Lapponaria, *Bdv. (?)*
 BISTON, *Leach.*
 Hirtaria, *L.*
 AMPHYDASIS, *Tr.*
 Strataria, *Hufn.*
 Prodromaria, *W.V.*
 Betularia, *L.*
 v. *Doubledayaria, Mill.*
- Boarmidæ, Gn.**
 HEMEROPHILA, *Steph.*
 Abruptaria, *Thun.*
 CLEORA, *Curt.*
 Viduaria, *W.V.*
 Angularia, *Thub.*
 Glabraria, *Hb.*
 Lichenaria, *Hufn.*
- BOARMIA, *Tr.*
 Repandata, *L.*
 v. *Conversaria, Hb.*
 v. *Destrigaria, Haw.*
 v. *Sodorensium, Weir.*
 Rhomboidaria, *W.V.*
 Gemmaria, *Brahm.*
 v. *Perfumaria, Newm.*
 Abietaria, *W.V.*
 v. *Sevicearia, Curt.*
 Cinctaria, *W.V.*
 Roboraria, *W.V.*
 Consortaria, *Fab.*
 TEPHROSIA, *Bdv.*
 Consonaria, *Hub.*
 Crepuscularia, *W.V.*
 Biundularia, *Bkh.*
 Luridata, *Bork.*
 Extersaria, *Hub.*
 Punctulata, *W.V.*
 GNOPHOS, *Tr.*
 Obscurata, *W.V.*
 v. *Serotinaria, Haw.*
 v. *Calceata, Stid. Cat.*
 v. *Dilucidaria, Steph.*
 DASYDIA, *Gn.*
 Obfuscata, *W.V.*
 PSODOS, *Tr.*
 Trepidaria, *Hb.*
 Coracina, *Esp. (?)*
- Boletobidæ, Gn.**
 BOLETOBIA, *Bdv.*
 Fuliginaria, *L.*
- Geometridæ, Gn.**
 PSEUDOPTERPNA, *Hb.*

Pruinata, *Hufn.*
Cytisaria, *W.V.*

GEOMETRA, L.

Papilionaria, *L.*
Smaragdaria, *Hub.*

NEMORIA, Hub.

Viridata, *L.*

IODIS, Hub.

Vernaria, *Hub.*
Lactearia, *L.*

PHORODESMA, Bdv.

Pustulata, *Hufn.*
Bajularia, *W.V.*

HEMITHEA, Dup.

Strigata, *Muell.*
Thymiaria, *L.*

Ephyridæ, Gn.

EPHYRA, Dup.

Porata, *L.*
Punctaria, *L.*
Trilineararia, *Bkh.*
Linearia, *Hb.*
Omicronaria, *W.V.*
Annulata, *Schulze.*
Orbicularia, *Hub.*
Pendularia, *L.*

Acidalidæ, Gn.

HYRIA, Steph.

Muricata, *Hufn.*
Auroraria, *Bk.*

ASTHENA, Hub.

Luteata, *W.V.*
Candidata, *W.V.*
Sylvata, *W.V.*
Blomeri, *Curt.*

EUPISTERIA, Bdv.

Obliterata, *Hufn.*
Heparata, *W.V.*

VENUSIA, Curt.

Cambrica, *Curt.*

ACIDALIA, Tr.

Perochraria, *Fisch.*

Ochrata, *Scop.*

Rubiginata, *Hufn.*
Rubricata, *W.V.*

Dimidiata, *Hufn.*
Scutulata, *W.V.*

Bisetata, *Hufn.*

Trigeminata, *Haw.*

Contiguaria, *Hub.*

Rusticata, *W.V.*

Holosericeata, *Dup.*

Dilutaria, *Hub.*
Interjectaria, *Bdv.*

Virgularia, *Hub.*
Incanaria, *Hub.*

Circellata, *Gn.*

Ornata, *Scop.*

Marginepunctata, *Goze.*
Promutata, *Gn.*

Straminata, *Tr.*

Subsericeata, *Haw.*
v. Mancuniata, Knaggs.

Immutata, *L.*

Strigaria, *Hub. ?*

Remutata, *Hub.*

Fumata, *Steph.*

Strigilata, *W.V.*

Imitaria, *Hub.*

Emutaria, *Hub.*

Aversata, *L.*

v. Spoliata, Std. Cat.

Inornata, *Haw.*

Degeneraria, *Hub.*

Emarginata, *L.*

TIMANDRA, Dup.

Amataria, *Dup.*

Caberidæ, Gn.

CABERA, Tr.

Pusaria, *L.*
Rotundaria, *Haw.*
Exanthemaria, *Scop.*

CORYCIA, Dup.

Temerata, *W.V.*
Bimaculata, *Fab.*
Taminata, *W.V.*

ALEUCIS, Gn.

Pictaria, *Curt.*

Macaridæ, Gn.

MACARIA, Curt.

Alternata, *W.V.*

Notata, *L.*

Liturata, *L.*

HALIA, Dup.

Wavaria, *L.*

Fidonidæ, Gn.

STRENIA, Dup.

Clathrata, *L.*

PANAGRA, Gn.

Petraria, *Hub.*

NUMERIA, Dup.

Pulveraria, *L.*

SCODIONA, Bdv.

Belgiaria, *Hub.*

SELIDOSEMA, Bdv.

Plumaria, *W.V.*
Ericetaria, *Vill.*

FIDONIA, Tr.

Carbonaria, *L.*

Atomaria, *L.*

Piniaria, *L.*

v. Flavescens, White.

- Brunneata, *Thnb.*
 Pinetaria, *Hb.*
 Limbaria, *Fab.*
 Conspiciuata, *W.V.*
 MINOA, *Tr.*
 Murinata, *Sc.*
 Euphorbiata, *W.V.*
 SCORIA, *Steph.*
 Lineata, *Sc.*
 Dealbata, *L.*
 APLASTA, *Hb.*
 [Ononaria, *Fues.*]
 STERRHA, *Hb.*
 Sacraria, *L.*
 LYTHRIA, *Hab.*
 Purpuraria, *L. ?*
 ASPILATES, *Tr.*
 Strigillaria, *Hab.*
 Ochrearia, *Rossi.*
 Citraria, *Hab.*
 Gilvaria, *W.V.*
Zerenidæ, Gn.
 ABRAXAS, *Leach,*
 Grossulariata, *L.*
v. Varleyata, Porritt.
 Sylvata, *Scop.*
 Ulmata, *Fab.*
 LIGDIA, *Gn.*
 Adustata, *W.V.*
 LOMASPILIS, *Hab.*
 Marginata, *L.*
Ligidæ, Gn.
 PACHYCNEMIA, *Steph.*
 Hippocastanaria.
Hybernidæ, Gn.
 HYBERNIA, *Lat.*
- Rupicaprararia, *W.V.*
 Leucophæaria, *W.V.*
v. Marmovinaria, Esp.
v. Nigricaria, Haw.
 Aurantiaria, *Esp.*
 Marginaria, *Bkh.*
 Progemmaria, *Hab.*
v. fuscata, Mosley.
 Defoliaria, *L.*
 ANISOPTERYX, *Steph.*
 Æscularia, *W.V.*
Larentidæ, Gn.
 CHEIMATOBIA, *Steph.*
 Brumata, *L.*
 Boreata, *Hab.*
 OPORABIA, *Steph.*
 Dilutata, *W.V.*
v. obscurata, Std. Cat.
 Filigrammaria, *H.S.*
 Autumnaria, *Gn.*
? præc. var.
 LARENTIA, *Tr.*
 Didymata, *L.*
 Multistrigaria, *Haw.*
 Cæsiata, *W.V.*
 Ruficinctata, *Gn.*
 Flavicinctata, *Steph.*
 Salicata, *Hab.*
 Olivata, *W.V.*
 Viridaria, *Fab.*
 Pectinitaria, *Knoch.*
 EMMELESIA, *Steph.*
 Affinitata, *Steph.*
v. Turbaria, Steph.
 Alchemillata, *L.*
 Albulata, *W.V.*
v. Griseata, Std. Cat.
v. Thules, Weir.
- v. Hebudiium, Weir.*
 Decolorata, *Hab.*
 Tæniata, *Steph.*
 Unifasciata, *Haw.*
 Ericetata, *Curt.*
 Minorata, *Tr.*
 Blandiata, *W.V.*
 Adæquata, *Bkh.*
 EUPITHECIA, *Curt.*
 Venosata, *Fab.*
 Insigniata, *Hab.*
 Consignata, *Bkh.*
 Linariata, *W.V.*
 Pulchellata, *Steph.*
 Centaureata, *W.V.*
 Oblongata, *Thnb.*
 Succentureata, *L.*
 Subfulvata, *Haw.*
v. Oxydata, Tr.
v. Cognata, Steph.
 Subumbrata, *W.V.*
 Scabiosata, *Bkh.*
 Pernotata, *Gn.*
 Plumbeolata, *Haw.*
 Isogrammaria, *H.S.*
 Haworthiata, *Bbl.*
 Pygmæata, *Hb.*
 Helveticaria, *Bdv.*
 Arceuthata, *Frr.*
? præc. var.
 Satyrata, *Hab.*
v. Fagicoloria, Crewe.
v. Callunaria, Sta.
 Egenaria, *H.S.*
 Castigata, *Hb. (?) Haw.*
 Jasionæata, *Crewe.*
 Trisignaria, *H.S.*
 Virgaureata, *Dbl.*
 Pimpinellata, *Gn. (non. Hub.)*
 Fraxinata, *Crewe.*

- Extensaria, *Fr.*
 Pimpinellata, *Hub.*
 Denotata, *Gn. (non. Hub.)*
 Valerianata, *Hub.*
 Viminata, *Dbl.*
 Pusillata, *W. V.*
 Irriguata, *Hub.*
 Denotata, *Hb.*
 Campanulata, *H. S.*
 Innotata, *Hufn.*
 Indigata, *Hub.*
 Constrictata, *Gn.*
 Nanata, *Hb.*
 Curzoni, *Gregson.*
 Subnotata, *Hb.*
 Vulgata, *Haw.*
 Albipunctata, *Haw.*
 v. Angelicata, Crewe.
 Expallidata, *Gn.*
 Absynthiata, *L.*
 Minutata, *Hb.*
 v. Knautiata, Gregson.
 Assimilata, *Dbl.*
 Subciliata, *Dbl.*
 Tenuiata, *Hub.*
 Lariciata, *Frey.*
 Dodoneata, *Gn.*
 Abbreviata, *Steph.*
 Exiguata, *Hub.*
 Sobrinata, *Hb.*
 Togata, *Hub.*
 Pumilata, *Hub.*
 Coronata, *Hub.*
 Rectangulata
 v. nigrosericcata, Haw.
 Debiliata
 COLLIX.
 v. Shetlandica, Weir.
- Sparsata,
 LOBOPHORA.
 Sexalata, *Hub.*
 Halterata, *Hufn.*
 Hexapterata, *W. V.*
 Viretata, *Hub.*
 Carpinata, *Bork.*
 Lobulata, *Hub.*
 Polycommata, *Hub.*
 THERA, *St.*
 Juniperata, *L.*
 v. Scotica, White.
 Simulata, *Hub.*
 Variata, *W. V.*
 v. Obeliscata, Hub.
 v. Obliterata, White.
 Firmata, *Hub.*
 YPSIPETES, *Steph.*
 Ruberata, *Frey.*
 Impluviata, *W. V.*
 Trifasciata, *Bkh.*
 Elutata, *W. V.*
 Sordidata, *Fab.*
 MELANTHIA, *Dup.*
 Bicolorata, *Hufn.*
 Rubiginata, *W. V.*
 v. Plumbeata, Curt.
 Ocellata, *L.*
 Albicillata, *L.*
 MELANIPPE, *Dup.*
 Hastata, *L.*
 Tristata, *L.*
 Procellata, *W. V.*
 Unangulata, *Haw.*
 Biriviata, *Hub.*
 Sociata, *Bork.*
 Subtristata, *Haw.*
 Montanata, *W. V.*
 v. Shetlandica, Weir.
- Galiata, *W. V.*
 Fluctuata, *L.*
 ANTICLEA, *Steph.*
 Cucullata, *Hufn.*
 Sinuata, *W. V.*
 Rubidata, *W. V.*
 Badiata, *W. V.*
 Derivata, *W. V.*
 Nigrofasciaria, *Goze.*
 Berberata, *W. V.*
 COREMIA, *Gn.*
 Munitata, *Hub.*
 Propugnata, *W. V.*
 Designata, *Hufn.*
 Ferrugata, *L.*
 Unidentaria, *Haw.*
 Quadrifasciaria, *L.*
 CAMPTOGRAMMA, *Ste.*
 Bilineata, *L.*
 v. Testaceolata, Sid. Cat.
 Fluviata, *Hub.*
 PHIBALAPTERYX, *Sid.*
 Tersata, *W. V.*
 Lapidata, *Hub.*
 Vittata, *Bork.*
 Lignata, *Hub.*
 Polygrammata, *Bork.*
 Vitalbata, *W. V.*
 SCOTOSIA, *Steph.*
 Dubitata, *L.*
 Vetulata, *W. V.*
 Rhamnata, *W. V.*
 Certata, *Hub.*
 Undulata, *L.*
 CIDARIA, *Tr.*
 Siterata, *Hufn.*
 Psittacata, *W. V.*

Miata, *L.*
 Picata, *Hub.*
 Corylata, *Thunb.*
 v. Albo-crenata, Curt.

Sagittata, *Fab.*

Truncata, *Hufn.*
 Russata, *W.V.*

v. Centum-notatum, Fab.

v. Comma-notatum, Haw.

v. Boreata, Curt.

v. Perfusata, Haw.

v. Centum-notata, Sch.

Immanata, *Haw.*

Suffumata, *Hub.*

v. Piceata, Steph.

Reticulata, *W.V.*

Silaceata, *Hub.*

Prunata, *L.*

Testata, *L.*

Populata, *L.*

Fulvata, *Forst.*

Pyraliata, *Bork.*

Dotata, *L.*

PELURGA, *Hub.*

Comitata, *L.*

Eubolidæ, *Gn.*

EUBOLIA, *Dup.*

Cervinata, *W.V.*

Mæniata, *Scop. (?)*

Limitata, *Scop.*
 Mensuraria, *W.V.*

Plumbaria, *Fab.*
 Palumbaria, *W.V.*

Bipunctaria, *W.V.*

Lineolata, *W.V.*
 Virgata, *Rott.*

CARSIA, *Hub.*

Paludata, *Thunb.*

v. Imbutata, Hub.

ANAITIS, *Dup.*

Plagiata, *L.*

LITHOSTEGE, *Hub.*

Griseata, *W.V.*

CHESIAS, *Tr.*

Spartiata, *Fues.*

Rufata, *Fab.*

Obliquaria, *W.V.*

Sionidæ, *Gn.*

TANAGRA, *Dup.*

Atrata, *L.*

Chærophyllata, *L.*

DREPANULÆ, *Gn.*

Drepanulidæ, *Gn.*

PLATYPTERYX, *Lasp.*

Lacertinaria, *L.*
 Lacertula, *W.V.*

Sicula, *W.V.*
 Harpagula, *Esp.*

Falcataria, *L.*
 Faleula, *W.V.*

v. Pallida, White.

Binaria, *Hufn.*
 Hamula, *W.V.*

Cultraria, *Fab.*
 Unguicula, *Hub.*

CILIX, *Leach.*

Glaucata, *Scop.*
 Spinula, *W.V.*

PSEUDO-BOMBYCES, *Gn.*

Dicranuridæ, *Gn.*

DICRANURA, *Lat.*
 CERURA, *Schr.*

Bicuspis, *Bkh.*

Furcula, *L.*

Bifida, *Hub.*

Vinula, *L.*

STAUROPUS, *Germ.*

Fagi, *L.*

PETASIA, *Steph.*

Sphinx, *Hufn.*
 Cassinea, *Fab.*

Nubeculosa, *Esp.*

Pygæridæ, *Gn.*

PYGÆRA, *Och.*

Bucephala, *L.*

CLOSTERA, *Hoff.*

Curtula, *L.*

Anachoreta, *W.V.*

Pigra, *Hufn.*
 Reclusa, *W.V.*

Notodontidæ, *Gn.*

GLUPHISIA, *Bdv.*

Crenata, *Esp.*

PTILOPHORA, *Steph.*

Plumigera, *W.V.*

PTILODONTIS, *Steph.*

Palpina, *L.*
 NOTODONTA, *Och.*
 Camelina, *L.*
 Cucullina, *W.V.*
 Carmelita, *Esp.*
 Bicolora, *Fab.*

Dictæa, *L.*
 Dictæoides, *Esp.*
 Dromedarius, *L.*
 Tritophus, *W.V.*
 Ziczac, *L.*
 Trepida, *Fab.*

Chaonia, *W.V.*
 *Trimacula, *Esp.*
v. Dodonæa, W.V.
 DILOBA, *Bdv.*
 Cæruleocephala, *L.*

NOCTUÆ, Linn.

TRIFIDÆ, *Gn.*

Bombyciformes,

[*Dbl. Cat.*

THYATIRA, *Och.*

Derasa, *L.*

Batis, *L.*

CYMATOPHORA, *Tr.*

Duplaris, *L.*

Fluctuosa, *Hub.*

Diluta, *W.V.*

v. nubilata.

Or, *W.V.*

Ocularis, *L. ?*

Octogesima, *Hub.*

Flavicornis, *L.*

Ridens, *Fab.*

Byrophilidæ, *Gn.*

BYROPHILA, *Tr.*

Muralis, *Forst.*

Glandifera, *W.V.*

v. Par, Hub.

Perla, *W.V.*

Algæ, *Fab. (?)*

Bombycoidæ, *Bdv.*

DIPHTHERA, *Och.*

Orion, *Esp.*

v. Runica, Haw.

ACRONYCTA, *Och.*

Tridens, *W.V.*

Psi, *L.*

Leporina, *L.*

v. Bradyporina, Tr.

Aceris, *L.*

v. Candelisequa, Esp.

v. Infuscata, Haw.

Megacephala, *W.V.*

Strigosa, *Fab.*

Alni, *L.*

Ligustri, *W.V.*

v. Coronula, Haw.

Rumicis, *L.*

v. Salicis, Curt.

Auricoma, *W.V.*

Menyanthidis, *Esp.*

Myricæ, *Gn.*

SIMYRA, *Och.*

Albovenosa, *Gotze.*

Venosa, *Bork.*

GENUINÆ, *Gn.*

Leucanidæ, *Gn.*

SYNIA, *Duf.*

Musculosa, *Hub.*

LEUCANIA, *Och.*

Conigera, *W.V.*

Vitellina, *Hub. (?)*

Turca, *L.*

Lithargyria, *Esp.*

Albipuncta, *W.V.*

Extranea, *Gn. (?)*

Loreyi, *Duf. (?)*

Obsoleta, *Hub.*

Putrescens, *Hub.*

Littoralis, *Curt.*

Pudorina, *W.V.*

Impudens, *Hub.*

Comma, *L.*

Straminea, *Tr.*

Impura, *Hub.*

Pallens, *L.*

Phragmitidis, *Hub.*

MELIANA, *Curt.*

Flammea, *Curt.*

SENTA, *Steph.*

Maritima, *Sausch.*

Ulvæ, *Hub.*

v. Wismariensis, Sch.

v. Nigrostriata, Std. Cat.

v. Bipunctata, Haw.

TAPINOSTOLA, *Led.*

Bondii, *Knaggs.*

Elymi, *Tr.*

NONAGRIA, *Och.*

Rufa, *Haw.*

Despecta, *Tr.*

- Fulva, *Hub.*
 Concolor, *Gn.*
 Hellmanni, *Evers.*
 Neurica, *Hub.*
 Brevilinea, *Fenn.*
 v. Alinea, Farn.
 Geminipuncta, *Hatch.*
 Cannæ, *Och.*
 Sparganii, *Esp.*
 Typhæ, *Esp.*
 Arundinis, *Fab.*
 Lutosa, *Hub.*
- Apamidæ, Gn.**
- GORTYNA, *Och.*
 Flavago, *W.V.*
 Ochracea, *Hub.*
- HYDRÆCIA, *Gn.*
 Nictitans, *L.*
 v. Erythro stigma, Haw.
 Petasitis, *Dbl.*
 Micacea, *Esp.*
- AXYLIA, *Hub.*
 Putris, *L.*
- XYLOPHASIA, *Steph.*
 Rurea, *Fab.*
 v. Combusta, Hub.
 Lithoxylea, *W.V.*
 Sublustris, *Esp.*
 Polyodon, *L.*
 Monoglypha, *Hufn.*
 Hepatica, *L.*
 Scolopacina, *Esp.*
- DIPTERYGIA, *Steph.*
 Pinastri, *L.*
- XYLOMIGES, *Gn.*
- Perspicillaris, *L.*
 Polyodon, *Clerk.*
- APOROPHYLA, *Gn.*
 Australis, *Bdv.*
- LAPHYGMA, *Gn.*
 Exigua, *Hub.*
- NEURIA, *Gn.*
 Reticulata, *Vill.*
 Saponariæ, *Bork.*
- HELIOPHOBUS, *Bdv.*
 Popularis, *Fab.*
 Hispidâ, *Hub.*
- CHARÆAS, *Steph.*
 Graminis, *L.*
- PACHETRA, *Gn.*
 Leucophæa, *W.V.*
- CERIGO, *Steph.*
 Matura, *Hufn.*
 Cytherea, *Fab.*
- LUPERINA, *Bdv.*
 Testacea, *W.V.*
 Guenii, *Dbl.*
 Dumerili, *Dup.*
 Cespitis, *W.V.*
- MAMESTRA, *Och.*
 Abjecta, *Hub.*
 Sordida, *W.V.*
 Anceps, *Hub.*
 Albicolon, *Hub.*
 Furva, *W.V.*
 Brassicæ, *L.*
 Persicariæ, *L.*
- APAMEA, *Och.*
 Basilinea, *W.V.*
 Connexa, *Bork.*
 Gemina, *Hub.*
 v. Remissa, Tr.
 Unanimis, *Hub.*
- Ophiogramma, *Esp.*
 Leucostigma, *Hub.*
 Fibrosa, *Hub.*
 v. Fibrosa, Hub.
 Oculea, *L.*
 Didyma, *Esp.*
 v. Leucostigma, Esp.
 v. I-niger, Haw.
 v. Rava, Haw.
- MIANA, *Steph.*
 Strigilis, *L.*
 v. Latruncula, W.V.
 v. Æthiops, Haw.
 Fasciuncula, *Haw.*
 v. Cana, Std. Cat.
 Literosa, *Haw.*
 Furuncula, *W.V.*
 Bicoloria, *Vill.*
 v. Rufuncula, Haw.
 Captiuncula, *Tr.*
 v. Expolita, Stainton.
- CELÆNA, *Steph.*
 Haworthii, *Curt.*
- Caradrinidæ, Gn.**
- GRAMMESIA, *Steph.*
 Trigrammica, *Hufn.*
 Trilinea, *W.V.*
 v. Bilinea, Hub.
- ACOSMETIA, *Steph.*
 Caliginosa, *Hub.*
- HYDRILLA, *Bdv.*
 Palustris, *Hub.*
- CARADRINA, *Och.*
 Morpheus, *Hufn.*
 Alsines, *Brahm.*
 Blanda, *W.V.*
 Taraxaci, *Hub.*

- Ambigua, *Fab.*
 Quadripunctata, *Fab.*
 Cubicularis, *W. V.*
- Noctuidæ, Gn.**
- RUSINA, *Steph.*
 Tenebrosa, *Hub.*
- AGROTIS, *Och.*
 Valligera, *W. V.*
 Vestigialis, *Hufn.*
 Puta, *Hub.*
 Suffusa, *W. V.*
 Ypsilon, *Rott.*
 Saucia, *Hub.*
 Segetum, *W. V.*
 Lunigera, *Steph.*
 Exclamationis, *L.*
 Spinifera, *Hub. (?)*
 Corticea, *W. V.*
 Cinerea, *W. V.*
 Ripæ, *Hub.*
 Cursoria, *Hufn.*
 Nigricans, *L.*
 Tritici, *L.*
 Aquilina, *W. V.*
 Obelisca, *W. V.*
 Agathina, *Dup.*
 Porphyrea, *W. V.*
 Strigula, *Thub.*
 Præcox, *L.*
 Ravida, *W. V.*
 Obscura, *Brahm.*
 Simulans, *Hufn.*
 Pyrophila, *W. V.*
 Lucernea, *L.*
 Helvetina, *Bdv. (?)*
 Ashworthii, *Dbl.*
- TRIPHÆNA, *Och.*
 Janthina, *W. V.*
 Fimbria, *L.*
- Interjecta, *Hub.*
 Orbona, *Hufn.*
 Subsequa, *W. V.*
 Comes, *Hub.*
 Orbona, *Fab.*
 v. *Curtisii, Newman.*
 Pronuba, *L.*
 v. *Innuba, Tr.*
- NOCTUA, *Gn.*
 Glareosa, *Esp.*
 Depuncta, *L.*
 Augur, *Fab.*
 Plecta, *L.*
 Flammatra, *W. V. (?)*
 C-nigrum, *L.*
 Ditrapezium, *Bork.*
 Triangulum, *Hufn.*
 Rhomboidea, *Tr.*
 Stigmatica, *Hub.*
 Brunnea, *W. V.*
 Festiva, *W. V.*
 Conflua, *Tr. ? præc. var.*
 Dahlii, *Hub.*
 v. *Erythrocephala, Haw.*
 Subrosea, *Steph.*
 Rubi, *View.*
 Bella, *Bork.*
 Umbrosa, *Hub.*
 Baja, *W. V.*
 Sobrina, *W. V.*
 Castanea, *Esp.*
 Neglecta, *Hub.*
 v. *Neglecta, Hub.*
 Xanthographa, *W. V.*
- Orthosidæ, Gn.**
- TRACHEA, *Gn.*
 Piniperda, *Esp.*
- PACHNOBIA, *Gn.*
 Hyperborea, *Zett.*
 Alpina, *West.*
- TÆNIOCAMPA, *Gn.*
 Gothica, *L.*
 v. *Gothicina, H.S.*
 Leucographa, *W. V.*
 Rubricosa, *W. V.*
 Incerta, *Hufn.*
 Instabilis, *W. V.*
 Opima, *Haw.*
 Populeti, *Fab.*
 Stabilis, *W. V.*
 Gracilis, *W. V.*
 Miniosa, *W. V.*
 Munda, *W. V.*
 Cruda, *W. V.*
 Pulverulenta, *Esp.*
- ORTHOSIA, *Och.*
 Suspecta, *Hub.*
 Ypsilon, *W. V.*
 Lota, *L.*
 Macilenta, *Hub.*
- ANCHOCELIS, *Gn.*
 Rufina, *L.*
 Pistacina, *W. V.*
 Lunosa, *Haw.*
 Litura, *L.*
- CERASTIS, *Och.*
 GLÆA, *Steph.*
 Vaccinii, *L.*
 Spadicea, *W. V.*
 Erythrocephala, *W. V.*
 v. *Glabra, W. V.*
- SCOPELOSOMA, *Curt.*
 Satellitia, *L.*
 DASYCAMPA, *Gn.*
 Rubiginea, *W. V.*



INTRODUCTION

TO

BOTANY.

BY

J. P. SOUTTER,

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THE young student of botany is as a rule dismayed on the very threshold of the science, by the formidable array of long unpronounceable names, which, to him, seem inseparable from a study of the subject, and he wonders why the humble weeds and beautiful flowers should be shrouded in such an array of hard technical terms. That there is a certain amount of truth in this impeachment cannot be gainsaid; still it may be safely averred, that botany as a science is freer from such a mass of verbal jargon than any other of the natural sciences. And one may acquire a fair knowledge of the of the elementary process of plant life, and a sufficiently intimate acquaintance with the classifying and arranging of the plants which may be collected in one's Summer walks, with the vocabulary in use in every-day life, or at least with occasional reference to a good dictionary.

Arrangement or organization is what constitutes the difference betwixt a mob or multitude of people and a well-drilled army. So with plants. What seems to the casual observer a multifarious assemblage, by a little systematic arrangement becomes an array of orderly individuals, all less or more closely related to each other. And the skilled botanist can at once tell from the characteristics of any single plant, its place and position in the general arrangement, and indicate with which others it has the greatest affinity, and with whom it should stand side by side in close alliance. To attain this end, or rather, perhaps, to explain the relative position of one plant to another accurate language is necessary. So, to avoid needless repetitions, and be concise as well as precise, various terms are used, which, although they may

at first appear rugged and uncouth, soon become easy and familiar as household words to the student who has his heart in the work. Of course, an intimate or profound knowledge of the science of botany cannot be attained without steady and diligent application, more than in the case of any other scientific pursuit, but it has the advantage that the objects of research are usually of themselves attractive and lovely, and it has always the charm of freshness and novelty as each returning season brings old favourites to their chosen haunts, or new discoveries are made in fresh rambles, or in sequestered nooks of familiar walks.

It has always been my endeavour in the previous articles in the *Young Naturalist* to avoid as far as possible all technical terms or to explain them in the context. But in commencing a new series in connection with the supplement scheme of the Editor, it was deemed advisable to write an introductory paper, detailing some of the leading features of plant life, and explaining once for all a few of the more commonly used terms of descriptive and classificatory botany. One of the gravest objections to persons who have not received what is known as a classical education, and mumbled the dry bones of dead languages, is that the names of plants are all shrouded in the Latin tongue. The reason is that Latin is the recognised language of science, and forms a means of mutual intercourse amongst scientific professors, whilst the same name being used in all languages, the exact plant can be accurately determined in all countries. Just as an Englishman does not change his name or lose his individuality when he travels on the Continent or migrates to Australia or India. So the daisy is *Bellis perennis*, or the Primrose *Primula vulgaris* wherever it is found, although the common or vernacular name of daisy or primrose varies with the country or locality, as the nickname or pet name of a person passes current only in his village or family. Besides one does not require to learn a long string of jaw-breaking names in order to recognise, understand and love the winsome daisy or fragrant primrose, these are already enshrined in the heart and endeared to the affections of every lover of nature, they are known and loved of all men. But when one meets a flower which is quite new to him, it is just as easy to know and remember it by its proper scientific name as by any other. In all such cases familiarity is everything, no one thinks of objecting to *Geranium* or *Fuchsia* because it is the scientific as well as the common name of these favourite flowers. Nor does there seem any difficulty in pronouncing or remembering even the longest name in the list of British flowers—*Chrysanthemum*—for at Christmas-time it is on everybody's lips. Although, doubtless, many of these names are to the learned barbarous, and to the illiterate jargon, yet the majority of them are far from meaningless, and are indeed

often very appropriately bestowed, from some peculiar characteristic of the plant. Take for instance the plants already cited, *Chrysanthemum*, the name of the genus means the "yellow" or "golden flower," and many of the plants are of this colour, whilst the most common British species, *Leucanthemum*, meaning the "white flower," is appropriate enough to the ox-eye daisy, with its large conspicuous spreading ray of white petals, as being the white flowered individual amongst a yellow flowered family. In the same way *Bellis*, signifying "beautiful," is applicable to the daisy, whilst *perennis* refers to its duration, continuing to live on from year to year.

Having drifted so far on this branch of the subject, it may be well to explain in this connection the principle upon which plants are named, and how they are arranged and grouped together; also, the reason a plant has two names, or, as we may say, a christian and surname. The immortal Linneus may be regarded as the father of systematic botany, for he was the first to attempt to evolve something like order out of the previous chaos of plant names. As he took for the basis of his arrangement certain arbitrary characters, chiefly the number and position of the parts of the flower alone, so plants with no real affinity were often placed side by side in a strange medley. This was known as the Linnean or artificial system, and, although now almost obsolete, for a local or limited flora it was very useful, especially to a beginner, enabling him readily to learn the name of a new plant, but conveying little or no idea of the structure or affinity of the plant itself. Since the times of Linneus, various attempts have been made to construct a more comprehensive and complete system of arrangement, and what is now known as the Natural system is the result. This takes cognisance of all the parts of a plant's structure, and groups together those having the greatest affinity or mutual points of resemblance. Some modification of this system is now in universal use, and by it all plants are primarily divided into two main groups, viz.: PHANEROGAMS, from *phaneros*, open, and *gamos*, a marriage, i.e. plants having evident flowers, and which are reproduced by true seeds; and CRYPTOGAMS, from *kryptos*, concealed, and *gamos*, marriage—including those plants which bear no conspicuous flowers, and the reproduction of which is comparatively obscure, to this latter class belong the ferns, mosses, fungi, &c., and the study of which is only taken up by experts, for whom these papers are not intended, so we may leave them on one side till we have overtaken the Phanerogams. These again are ranged in two divisions, viz.: GYMNOSPERMÆ, those having their seeds naked or not enclosed in a seed-vessel, represented in Britain by the pines and firs only; and ANGIOSPERMÆ, those having their seeds contained in an ovary or seed vessel, to which the great bulk of our native plants belong. Angiosperms are again divided into

two classes DICOTYLEDONS and MONOCOTYLEDONS according as there are one or two leaves in the embryo of the seed. There are certain other broadly marked distinctions very useful to a beginner, such as that Dicotyledons have the leaves net veined, and the parts of the flowers in multiples of two or five, whilst in Monocotyledons the leaves have parallel venation little if at all branching, and the parts of the flowers are in multiples of three. These two classes are again divided into several sub-classes, such as *Gamopetalæ*, which includes all Dicotyledonous plants which have the petals of the flower less or more united; and thus we reach an Order, which signifies an assemblage of plants, having several well marked points of resemblance, as *Leguminosæ* which have the peculiar shaped corolla of the pea, and the fruit some form of a pod. A genus is a still more restricted group of plants in which the individuals resemble each other still more closely have as we might say a well marked family likeness, as the various buttercups of the genus *Ranunculus*. This leads us to the last group of all, a species, which is a collection of individuals resembling each other in all essential points, whilst yet retaining a certain personality as the stalks of wheat or barley in a field. As the tendency of nature is to merge and shade off one form into another without any abrupt line of demarcation, so the exact value apportioned to certain characters will vary with different views, hence the diversity of opinion as to what constitutes a species, and as to what characters should be ignored and which others raised to generic rank. What is regarded by one authority as a good species would by another be looked upon as only a variety or the deviation be passed over as even too trivial for remark. This accounts for the initial letter or name, appended to the plant name, such as L. for Linneus or D.C. for De Candolle, which signifies that the name is applied to the plant answering the description of these botanists. This distinction is imperatively necessary for the accurate student, as unfortunately the same plant has frequently been described, under diverse names, by different botanists unknown to each other. The following table will serve to illustrate these remarks by showing the classificatory position of the common daisy:—

Group ...	Phanerogamia
Division ...	Angiospermae
Class ...	Dicotyledones
Sub-class ...	Gamopetalæ
Order ...	Compositæ
Genus ...	Bellis
Species ...	Perennis L.

HOW PLANTS GROW.

WITHOUT entering into any elaborate explanation of the varied phenomena of plant growth, a simple and easy performed experiment will furnish an interesting illustration which will convey a very tangible idea of the elementary processes of plant nutrition and growth. Procure a penny worth of mustard and cress seeds from a seedsman, then soak a piece a flannel in water and scatter a few seeds on its surface. Keep the flannel moist, a good way being to put it in a small common flower pot, and set it in a saucer containing a little water, when the moisture will rise up through the flannel and keep the surface damp. Place the pot in a moderate and equable temperature, an ordinary sitting room will answer quite well, and in twenty-four hours it will be observed that the seeds have swollen to twice their original size. This is caused by the water which they have imbibed, it will also be noted that the outer skin of the seed has burst, and a small worm-like body is being protruded. These are the young roots, and by the second day they will be seen to have increased considerably in length, and in whatever position the seeds have fallen the young roots will have all turned downwards, and the extremities are seen endeavouring to burrow into the substance of the flannel, seeking towards darkness and moisture. By the third day they have become greatly elongated so as to raise the whole seed upwards, and they have also developed numerous small white hairs, which also closely adhere to the surface of the flannel. These act the part of mouths or suckers and greedily drink up the water which is employed in this transmutation of substance. By this time the roots having secured an anchorage by these holdfasts, the infant stem is seen struggling to free itself from the swaddling clothes of the seed covering, and to emerge upwards into the air and light. By and bye it shakes off the brown ruptured seed coat and displays two flat, roundish, smooth green leaves in the case of the mustard and two cleft or fingered ones in the cress. In the course of a few days the stem has grown considerably and elevated the seed leaves an inch or two above the surface, whilst the roots have penetrated some distance into the flannel. In about a week's time they will have attained their full growth, when they will remain stationary for another week and then gradually wither away. This is the process known as germination for which three things are absolutely necessary, viz.—air, warmth, and moisture and by the aid of these, the vital forces stored up in the seed are able by nature's wonderful alchemy to transform the apparently dead inert substance of the seed into the living growing plant. An exactly similar process is seen in the manufacture of malt, where the barley is allowed to sprout to a certain extent

in order that the nutrient material stored up in the grain may be changed and rendered soluble by the vital phenomena of growth.

But for the plant to attain full vigour something more than water is necessary. If a few seeds are sown in ordinary garden soil in a pot the same mode of development may be observed, but the root is hidden underground, and only the seed leaves are seen elevated into the air. Instead, however, of stopping at that stage of growth as shown in the other experiment, the stem will lengthen out, fresh leaves will be formed, and in due time the plant will produce flowers and fruit. This shows that an essential requisite of plant growth is derived from the soil, and yet the amount of mineral constituents contained in the plant is relatively very small. A large portion of a young growing plant is formed of water, hence the great loss of weight which is observed when the plant is dried. Of what remains of the dry weight and bulk the chief proportion is carbon which has been abstracted from the atmosphere, and only a very minute quantity of mineral substance remains, which has been taken from the earth.

If a plant is burned in the open air the water is driven off as vapour, the carbon flies away as smoke, and only a small quantity of white mineral ash is left behind. But if the fire be smothered when burning fiercely, or if the plant be cremated in a closed retort, the residue is a very complete and perfect skeleton, composed of almost pure carbon, the water having been evaporated, this is commercially known as charcoal, and it has been derived from the atmosphere where there is always present a small quantity of carbon di-oxide, which is derived from the breathing of animals, the combustion of fires, &c. This is absorbed by the leaves and built up by the vital activity of the plant into its various tissues. It is, therefore, plain that the plant has two sources of food supply—liquid and gaseous. The roots imbibe the liquid nutriment in the form of water in which is dissolved various mineral salts and earths, including also nitrogen which is washed down by the rains into the soil, whilst the gaseous elements are continually being absorbed by the leaves. The nutrition of the plant is solely performed by these two organs and nothing in the laboratory of nature is more marvellous than the magical power by which the dead inert inorganic elements are changed as by a wizard's touch into the stately tree, the fragrant flower, and the nutritious life sustaining fruit.

HOW PLANTS ARE REPRODUCED.

MAN in his vanity is but too apt to conceive that he is the acme and perfection of nature's handiwork, therefore, in virtue of this position every manifestation of nature's power and skill in other forms of life are subordinate

to his wants and needs. That in point of fact, all the other evidences of creative ability are only meant to subserve his ends, and are of value only as they are of use to him. If the thought is rather gratifying to his pride it is also calculated to be slightly humiliating to his self esteem to think that he could not construct a single meal to sustain his vital existence from the raw materials of nature's workshop. All the substances which go to build up his wonderful framework and mechanism must first have passed through the manufactory of the vegetable, before it can be utilised in the animal economy. Even in the carnivora or purely flesh-eating animals, who devour their food as it may be said second-hand, it is carrying the initial stage only a remove farther back till we come to the literal fulfilment of the adage that "all flesh is grass." Imbued with this utilitarian idea that all plants were made for the use of man, he is prone to overlook the fact that the primary aim of a plant's existence is to live, grow, and re-produce the species. For this end certain parts of the plant are endowed with peculiar powers, and set apart for the performance of particular functions, the aim of which is to ensure the perpetuation of the race. These organs are called the reproductive organs, and are popularly known as the flowers. A typical flower is seen to be composed of four distinct rows or whorls of parts, called the calyx, corolla, stamens, and pistil. Of these the first two are protective and non-essential, and may be absent altogether, whereas the two others being absolutely necessary for the formation of seeds must always be present in some shape or other. Take for illustration the blossoms of a common wallflower, at the top of the short stalk which bears the solitary flower, will be seen four narrowish green little scales, they are quite separate from each other, and very easily removed, individually they are called sepals, and together they form the calyx. On the unopened flower buds they enclose the more tender portions of the plant, so their function is entirely protective. Within the calyx is found the corolla, the single parts of which are called petals. This is the portion of the reproduction organs, which is popularly known as *the* flower, because it is the most conspicuous part of the blossom from the many brightly coloured hues which it displays. Its function is partly protective, and more often specially attractive, serving to allure and guide insects by its pleasing tints and peculiar markings. In the wallflower there are four distinct petals with a rather long narrow claw, and a flat spreading limb, arrayed in the form of a cross X. They are very easily detached when there are left exposed, six slender stalks with oblong knobs at the top; these are the stamens, the stalk being called the filament and the enlarged portion at the top, the anther. Within the anther is contained a highly specialised substance called the pollen; it is usually found in the form

of light powdery grains, and it has the peculiar property when applied to the stigma, of protruding a tube which burrows down through the length of the style till it reaches the ovary, and when it touches the little bodies found there, and which are called ovules, it impregnates them and they then develop into seeds. The pistil, which is the central organ of the flower, varies very much in appearance; it may be composed of one or several distinct parts called carpels, each of which is again composed of three portions. (1) The stigma, which is the extreme tip, and exudes a gummy secretion which retains the pollen grains when they alight upon it, and also excites them into activity to develop the pollen tube. (2) The style, which is simply a stalk to elevate the stigma into a better position for catching the pollen grain, it is not essential and is often absent altogether. (3) The ovary, this is simply a box or case, containing the ovules, which ultimately become the seeds. The simplest form of pistil is seen in the buttercup, where the collection of little yellowish knobs in the centre of the flower are individual carpels, each consisting of an ovary containing a single ovule (or seed), and a very short hooked style, the tip of which forms the stigma. Another simple form of pistil is seen in the garden pea, where we have only a solitary carpel, the ovary forms the well known pod, and the little ovules become the familiar peas, which are the seeds of the pea plant. Very often in shelling peas it is noticed that some of the peas in a pod are small and shrivelled, these are abortive ovules, which through some cause have failed to be fecundated by the pollen tubes, and therefore have never developed into full grown peas (or seeds) containing young plantlets. At the top of the pea-pod (ovary) is seen the style, a short curved stalk, crowned by the stigma. In our wallflower the ovary is pod-like in its external form, but it is made up of two united carpels, as may easily be seen when it is ripe, for it then splits up in curious fashion, the two outer scales curl upwards and expose two rows of seeds, on each side of a central partition. In the wallflower the style is almost entirely obsolete, and the stigma is the notched top of the ovary. In the primrose an even more complicated pistil is found, in it five carpels are united to form the ovary, the partitions are at first separate, but they soon become obliterated, and the seeds are seen clustered together in the centre, quite free from the surrounding walls of the ovary, the style is a slender pin-like stalk and the stigma is the pin-head at the apex. But through all these varied forms it will be noticed that the essential points remain the same—there must be stamens containing perfect pollen, which in turn must be conveyed to the stigma, and thence descending to the ovary perform the function of energising and stimulating into vital activity, the hitherto dormant, passive, waiting ovules, which then start into a fresh phase of existence. This process is known as fertilisation.

HOW PLANTS ARE FERTILISED.

At first sight nothing would appear to be easier of accomplishment than that the pollen in the stamens should be conveyed to the immediately adjacent stigmas in order to fecundate them. And yet, strange as it may seem, the the most elaborate and in some cases intricate contrivances are employed by nature to avert this consummation. It is now a well known and widely recognised fact, that in the animal world intermarrying or interbreeding is not conducive to the well-being of the stock. Those communities or sects, in which intermarriage is inculcated as a duty, are soon found to deteriorate in physical stamina and mental prowess. The farmer also knows full well how soon his flocks and herds degenerate unless his stock is renovated by the infusion of fresh blood. And he is kept always up to the mark of the higher level by the depreciation of prices, entailed by keeping breeds of an inferior strain. The agriculturist has long practised rotation of crops in order to take full advantage of the capabilities of his soil, and he, too, soon learned the beneficial effects of a change of seed, *i.e.* the produce of similar plants grown in different soil. The horticulturist and gardener attains the same end by eliminating the weaker and more worthless amongst his seedlings, thus perpetuating only the finer and choicer varieties, which he assiduously propagates by layers, grafts, budding, cuttings, &c, so as to retain the good and expunge the noxious qualities of the plants. Nature by similar, if perhaps slower, methods attains the same end. The survival of the fittest, and the fierce struggle for existence, may be studied during each recurring spring-time, in woodland, field, or roadside, where the innumerable seedlings are pushing through the ground and elbowing each other out of the way, the stronger and more vigorous obtaining and keeping possession of the limited growing space. It is then that every little advantage, however slight, tells in favour of the fortunate possessor, and the inheritor of the most robust constitution is certain to be the winner in life's race. This being so, numerous experiments have tested and proved that seeds, the result of cross-fertilisation, produce a stronger progeny, hardier and more prolific than others the product of self-fertilised flowers. By self-fertilised is meant when the pollen from the stamens is conveyed to the stigma of the same individual blossom, as if, for example, the pollen of the numerous stamens of a rose or buttercup were to be shed upon the central stigmas which they surround. Whilst in cross-fertilisation the pollen of one flower has to be conveyed to the stigmas of another blossom, it may be on the same plant, but for its full efficacy to be obtained it should be transferred to a different plant. Of course it must be of the same species, otherwise a hybrid would be the result,

and even these can only be produced amongst closely allied plants, for if they are too widely separated the transmitted pollen would have no effect. As already indicated, an almost infinite variety of devices are employed to ensure this desirable object, the most certain and efficacious being the complete separation of the two organs, and their development on distinct and different plants. By this arrangement one-half of the individual plants of a species will produce stamens only, which will be known as stameniferous or staminate, whilst the other half will bear pistils only and be called pistilliferous or pistillate. From what has been already explained, it will be clearly understood that these latter only are, or can be the fruit-bearing portion. This class of plants is called *diœious*, because the sexes are located in two houses. To this category a large and apparently increasing number of plants belong, such as the whole family of willows and poplars, also various common plants, which derive their specific name from this peculiarity, such as the Red Campion (*Lychnis dioica*), the Marsh Valerian (*Valeriana dioica*), the Mountain Everlasting (*Antennaria dioica*), the Common Nettle (*Urtica dioica*), and numerous others. A modification of this provision is manifest in another large class of plants known as *monœious*, in which the stamens and pistils are produced on different parts of the same plant, therefore a portion of the blossoms on a plant are staminate only, whilst the rest are pistillate or fruit-bearing. A great many of our well-known forest trees belong to this class, such as the oak, beech, chesnut, hazel, birch, firs, &c., also the very extensive order of the sedges (*carex*). Such plants have rarely conspicuous flowers in the ordinary sense of the word, with largely developed calyx and showy corolla, the stamens being usually clustered together in catkins, and after they have shed their pollen they shrivel, wither, and drop off, leaving the pistillate flowers to mature and perfect the fruit. In these two classes it is evident that cross-fertilisation must be the rule. But in the large number of common and conspicuous flowers, which are called complete or perfect, because the stamens and pistils are aggregated together in the same blossom (hence known as *hermaphrodite*), the same result is not so apparent.

Besides these three types of flowers there are a few plants, such as the common ash, which are known as *polygamous*, because in their own persons are united the characteristics of all the three. Thus in a grove of ash trees, a certain proportion will be found producing staminate flowers only, these are readily recognised in autumn by the absence of all fruit. Another section bear perfect pistillate flowers, but the stamens are abortive containing no potent pollen, these are easily distinguished by the numerous clusters of fruit with which the branches are ornamented in autumn, remaining well into the winter. Whilst the third portion produce perfect but not so fruitful flowers,

thus partaking of the characteristics of both types and excelling in neither, the crop of fruit being meagre compared with the truly pistillate trees. The ash may thus be regarded as approaching or tending towards the fully diœcious state, and a somewhat similar condition may be noted in the common thyme (*Thymus serpyllum*), the spindle tree (*Euonymus Europæus*), the holly, &c.

In such transition plants, although both the essential organs may be represented in the flower, one or other of them is less or more rudimentary and abortive. Thus in a blossom with a perfect fruit-bearing pistil the stamens will be abortive or functionally inert, whilst in the corresponding bloom with fully developed stamens the pistil will be absent or unfertile. But even in hermaphrodite flowers, in which both the organs are present and perfect, self-fertilisation is prevented by their arriving at maturity at different periods. To this arrangement of flowers the term *dichogamy* is applied, meaning two different marriages. Those in which the stigma matures first, and in which it has passed the receptive stage, and must have been impregnated before its own stamens have shed their pollen, are called *proterogynous*. Such are seen in the common crocus, where the fimbriated or fringed stigmas may be observed protruded for days previous to the expansion of the perianth and the ripening of the stamens, and by the time they are ready to discharge their pollen, the stigmas have lost the power of being fecundated by it. The same conditions occur in the arum (*Arum maculatum*), the knotted figwort (*Scrophularia nodosa*), in several of the plantains (*Plantago*), but such cases are comparatively rare. The *proterandrous* condition occurs far more frequently in this, as its name implies the stamens arrive at maturity and emit their pollen previous to the stigmas reaching the receptive stage, when they can be acted upon by it. This is a very general condition, and seems to be widely prevalent amongst the most diverse and distantly related orders of plants. Thus almost every member of the large and eminently natural order *Umbelliferae*, which includes hemlock, parsley, parsnip, carrot, &c., exhibits these stages. It predominates in the allied order *Saxifragaceae*, and also prevails to a large extent in *Compositae*, whilst representatives occur in every assemblage of plants, this condition being indeed far more common than that in which the two organs arrive at maturity simultaneously. In certain plants, as some of the geraniums and pinks for example, where there are a limited and definite number of stamens, one-half of them ripen and disperse their pollen at an early stage, whilst the other half mature a little later, and just prior to the unfolding of the stigmas, so that there is a chance of their being self-fertilised. Another obvious way of securing cross-fertilisation is by the stamens and stigma being placed at different levels, so that unaided the pollen could not reach its destination. This is exemplified in

the flowers of the common primrose, and such plants are called *heteromorphic*, because they have different forms of flowers on the same species. In the primrose, in one-half of the flowers the stamens will be found at a higher level and overtopping the style, whilst in the other moiety the style rises considerably above the stamens. Similar forms of flowers may be seen in the cowslip (*Primula veris*), the lungwort (*Pulmonaria*), and various species of flax (*Linum*), and in the purple loosestrife (*Lythrum salicaria*) no less than three different lengths of stamens and styles are found. Experiments have conclusively proved that full fertility in such plants can only be obtained when the pollen from the stamens of a proper length is conveyed to the stigmas at the right level. In tubular flowers which hang down, such as numerous bell-flowers, heaths, fuchsias, &c., the style projects far beyond the stamens, but the stigmatic surface being at the extreme tip, the pollen would and does fall harmlessly and uselessly past it. But a volume instead of a chapter might be written on these elaborate contrivances, and it may be set down as a botanical axiom that nature abhors self-fertilisation.

THE POLLEN CARRIERS.

Having dilated at such length on the obstacles to self-impregnation, I shall more briefly describe how these difficulties are surmounted and cross-fertilisation accomplished. For this purpose two agencies are employed, viz. the wind and insects. Plants which are directly fertilised by the wind are called *Anemophilous*, whilst those which are dependent on the visits of insects are known as *Entomophilous*. There are several salient features which are always associated with these two diverse types, and the young botanist can scarcely have a more interesting field of study than to segregate and classify the plants he may meet with, according as they may belong to one or other of these two divisions. Anemophilous plants are remarkable for the production of enormous quantities of pollen, disseminated as it is by such an erratic agency, for the wind bloweth where it listeth, and a great deal of it is scattered aimlessly and wasted in the air. To this cause is to be attributed the so-called sulphur showers, seen in the vicinity of pine forests, and which covers the ground with a yellow dust. The pollen itself is also generally very dry and powdery, so as to be easily scattered, and to its wide diffusion has been recently attributed the distressing ailment of hay fever, which is now supposed to be caused by its irritating particles getting into the air passages of the lungs and nostrils. Another characteristic feature is the early blossoming of this tribe of plants, the flowers appearing before the foliage, so as to avoid the interception of the pollen by the intervening

leaves. In evergreen plants such as firs, pines, yews, &c., in which this state occurs, the leaves are small and needle-like, so as to offer no hindrance to the transmission of the pollen. Anemophilous plants are usually destitute of a floral envelope to their flower, or it is at least open, shallow, and inconspicuous, a beautiful adaptation, as it would only prove an obstacle in the way of the free interchange of the pollen. Another marked feature is the prominent stigmas, these are almost invariably plumose or feathery, being densely clothed with a fringe of hairs to readily catch and retain the floating pollen. And the flowers themselves are often elevated on slender stalks, above the level of the surrounding vegetation. This is very noticeable in the plantains, sedges and grasses, whose extended stamens quivering in the wind, and their protruded stigmas dangling in the breeze and waiting to be impregnated, form an admirable illustration of this section to which also the great majority of our forest trees belong.

Nothing, perhaps, more fully or beautifully illustrates the correlation of the animal or vegetable kingdoms than the adaptation of parts, and the mutual benefits resulting from a free interchange of the courtesies of existence, than is apparent in the relations of flowers to insects. The absolute dependance of our more prominent insects upon their floral food is self-evident, as the devout poet has sung—

" How doth the little busy bee
 Improve each shining hour,
 And gathers honey all the day
 From every opening flower."

But the beneficial effects accruing to the flower itself may not be so immediately manifest. Yet taking for granted the utility of cross-fertilisation, no one who has watched an industrious bee as it restlessly flits from flower to flower rifling it of its sweets, and has noticed how the jacket of the little robber is dusted with the golden pollen, and the pouches on his thighs laden with the precious spoils, but will have been convinced by a moment's thought how easily the fertilising element may be conveyed from one plant to another by such means. The wonder is that hybrids do not more frequently occur and that species remain so distinct as they are. This can be accounted for by the fact that it is only within narrow limits that the potent pollen can exert its influence, falling harmlessly like so much inert dust upon unsuitable stigmas. It might prove tedious to discuss all the manifold blandishments, which the flower employs to allure its winged visitors, and it is beyond my province to attempt detailing the equally admirable adaptations of the insect guest's body for the purpose in view. But a study of this subject has done a great deal to clear up certain hitherto obscure and inexplicable features of floral struc-

ture and function. Thus the fragrance of flowers, that inimitable essence, so ethereal and yet so ravishing that the odoriferous emanation might well be regarded as the spirit of the blossoms; yet it needs be no ways degraded if it is also recognised as an added charm to entice the coy butterfly or coquetish moth. Whilst the delicious nectar on which they feast is the banquet spread for the invited guests, whose visits are productive of reciprocal benefits. The pleasing tints of colour which embellish our fields and make gay our gardens with their variegated hues, display their beauties to attract the ærial wanderers. Whilst every pencilled streak and projecting hair are honey-guides and finger-posts to indicate the proper path to the luscious stores which are always so placed as to be only accessible by the performance of a corresponding service to the plant. The elegant grace of form we so much admire in our tubular and bell-shaped blossoms, have their contours moulded to form convenient chambers, so as to extract from their visitors a toll of productive labour. The helmet cap of the monkshood, the slender spur of the columbine, larkspur and violet, the long tube of the honeysuckle, the closed lips of the snapdragon and the open portals of the foxglove, the arched hood and convenient threshold of the dead nettle, are all devices for this end. Even the very extravagance of floral shape and structure, as shown in the marvellous eccentricities of the orchid blossom, only betokens a more highly specialised form to fit it exclusively for certain definite purposes. As a class of plants, the orchids have become the most absolutely dependent upon the insect world for their existence, self-fertilisation having become an impossibility in the majority of them. Some have even grown so dependent upon individual orders of insects that were by any chance the insects to disappear from a particular district, the flowers as well would speedily cease to exist. This is averred of the helleborine (*epipactis*) and wasps. Numerous experiments have proved, that when entomophilous plants are carefully covered so as effectually to prevent the needful visits of the proper insects the flowers have borne no seeds. This is exemplified on a large scale in New Zealand, where the colonists have introduced the red clover of Britain, it flourishes luxuriantly, but never produces any seeds, because there are no humble bees, whose visits are absolutely necessary to its fertilisation. To sum up in a sentence, plants with showy flowers, and which emit perfume, or secrete stores of nectar, have laid themselves out for insect fertilisation; therefore to this cause we owe the gorgeous beauty of our blossoms, the delicious aroma of our flowers, and the delectable honey of our hives.

As the complete antithesis of this class of flowers, we have a small and obscure section of blossoms, which display no gaudy hues, exhale no enticing

odours, and secrete no mellifluous nectar. Their inconspicuous blossoms, which would scarcely be recognised as flowers at all, for they never expand to the sun's rays, or flaunt banners of brilliant dye to tempt the roving bee or erratic moth. The whole energy of the blossom is devoted to the production of seeds, a stamen or two evolves a few grains of pollen side by side with the receptive stigmas, which are thereby fecundated with the least possible expenditure of force, numerous seeds being the result. Such flowers are called *cleistogamic*, meaning a hidden or concealed marriage, and they occur in a few plants, such as violets, wood sorrel, dead nettle, &c. It is a curious fact that these plants produce showy, conspicuous flowers, evidently adapted for insect visits, and yet they are rarely fertile, for which these latter seeds bearing flowers seem a compensation. But of all we know of the beneficial effects of cross-fertilisation, it is more than likely that an occasional cross to infuse fresh vigour into the offspring does occur by means of these blossoms.

In this connection a reference may be made to the defences of plants, which are most frequently ingenious barriers to repel intruders, who would rob the flowers of their stores of nectar without affording any compensatory advantage to the plant. The most pertinacious and predatory of the unwelcome marauders are ants, and such like "crawling ferlies," whose partiality for sweets is notorious. Against these aggressors, the rigid hairs, which so frequently fringe the stem or the outer portions of the flower, are unscalable ramparts, aided in many cases by the moat-like receptacle of water in the leaves, as in teasel, or the glutinous exudation which clothes the stems of pinks, &c. Whilst the insatiable caterpillar and omnivorous slugs and snails are kept at bay by these devices of prickles, spines, hairs and gummy excretions.

HOW PLANTS INCREASE IN SIZE.

Although the sources of food supply and how they are utilized by the plant has already been indicated, it may still be a mystery to the botanical tyro how the young seedling can continue to grow and add continuously to its bulk, the sapling become a tree and the tree retain its majestic form, unimpaired for centuries. A noble tree is the largest of all living things, rivalled only by the leviathan of the seas in weight of carcase, but unsurpassed in size in the corner of the universe which it fills, and certainly unapproachable in its duration in the cycles of time. How these mammoth monarchs of the forest have been evolved from the tiny seed, and by what gradual accretions of atoms they have obtained their ponderous proportions

must surely interest the reflective mind. The early stages of growth are sufficiently simple, a single cell, which is the smallest resolvable individual unit of the vegetative body, and is a minute speck of vital substance with well defined limits and definite functions, most notable of which is its power of sub-division. Each actively growing cell splitting in two, both halves speedily attaining the size of its parent with a similar capability of indefinite multiplication. All the young growing parts of plants are composed of such simple elements, and some parts permanently retain this character, such as fleshy fruits and roots, like apples and potatoes.

A solitary typical vegetable cell is usually of a spherical or an egg-shape, but except in some of the lowest orders of plants, which are composed of isolated cells, it rarely long retains this primal shape. When aggregated together and suffering pressure on all sides they assume less or more of a dodecahedral form, that is a figure with twelve sides and twelve angles, but displaying a hexagonal, six sided or honeycomb appearance, in section. This which seems to be the normal form a soft plastic body takes when subjected to equal pressure on every side, may be easily and effectively illustrated by blowing a basin of soap bubbles. This rather childish amusement shows on a large scale the appearance of a section of *parenchymatous* tissue, such as a thin slice of young potato when seen under the microscope. Few things are more mobile and changeable than the growing parts of a plant, and very soon the rudimentary ribs of the skeleton of the plant begin to appear. Some of the cells elongate very much, becoming spindle-shaped, tapering to both ends, their extremities overlap, their walls grow hard and thick, and a dense rigid structure is formed known as *prosenchyma*. This substance which first makes its appearance amongst the ground or fundamental tissue (the *parenchyma*) of the plant has a tendency to arrange itself in a certain definite manner, usually assuming a wedge shape, with the thin end towards the centre of the stem. These are called *vascular bundles*, they form the framework of the plants, they are conspicuous and easily discernible as the veins or ribs of leaves, they impart solidity and strength to the stem, and become the firm wood of trees. These bundles form a well-defined circle round the stem, the central portion being the pith, which is invariably parenchymatous, but often in quickly growing plants it becomes absorbed, leaving the centre of the stem hollow as in grasses, umbelliferæ, dandelion. In others, such as elders and rushes, it remains a light dry porous substance, whilst in dense woody trees it gets almost squeezed out of sight in the process of growth.

- HOPORINA**, *Bdv.*
 Croceago, *W.V.*
- XANTHIA**, *Och.*
 Citrago, *L.*
 Fulvago, *L.*
 Cerago, *W.V.*
 v. *Flavescens*, *Esp.*
 Flavago, *Fab.*
 Silago, *Hub.*
 Aurago, *W.V.*
 Gilvago, *Esp.*
 Circellaris, *Hufn.*
 Ferruginea, *Esp.*
- CIRRHEDIA**, *Gn.*
 Xerampelina, *Hub.*
 v. *Unicolor*, *Std. Cat.*
- Cosmidæ**, *Gn.*
- TETHEA**, *Och.*
 Subtusa, *W.V.*
 Retusa, *L.*
- EUPERIA**, *Gn.*
 Fulvago, *W.V.*
 Paleacea, *Esp.*
- DICYCLA**, *Gn.*
 Oo, *L.*
 v. *Luneburgensis*, *Fr.*
- COSMIA**, *Och.*
 Trapezina, *L.*
 Pyralina, *W.V.*
 Diffinis, *L.*
 Affinis, *L.*
- Hadenidæ**, *Gn.*
- EREMOBIA**, *Steph.*
ILARUS, *Bdv.*
 Ochroleuca, *W.V.*
- DIANTHÆCIA**, *Bdv.*
 Irregularis, *Hufn.*
 Carpophaga, *Bork.*
- Capsophila**, *Bdv.*
 *Luteago, *W.V.*
 v. *Barrettii*, *Doubl.*
 Capsincola, *W.V.*
 Cucubali, *W.V.*
 Albimacula, *Bkh.*
 Nana, *Hufn.*
 Conspersa, *W.V.*
 *Cæsia, *W.V.*
 v. *Manani*, *Gregson.*
- HECATERA**, *Gn.*
 Dysodea, *W.V.*
 Chrysozona, *Bkh.*
 Serena, *W.V.*
- POLIA**, *Och.*
 Chi, *L.*
 v. *Olivacea*, *Steph.*
 Flavocincta, *L.*
 *Xanthomista, *Hub.*
 v. *Nigrocincta*, *Tr.*
- DASYPOLIA**, *Gn.*
 Templi, *Thunb.*
- EPUNDA**, *Dup.*
 Lutulenta, *W.V.*
 v. *Luneburgensis*, *Fr.*
 Nigra, *Haw.*
 Viminalis, *Fab.*
 v. *Obscura*, *Std. Cat.*
 Lichenea, *Hub.*
- VALERIA**, *Germ.*
 [Oleagina, *W.V.*]
- MISELIA**, *Och.*
 Oxyacanthæ, *L.*
 v. *Capucina*, *Mill.*
- AGRIOPIS**, *Bdv.*
 Aprilina, *L.*
- PHLOGOPHORA**, *Och.*
- Meticulosa**, *L.*
Flammea, *Esp.*
Empyrea, *Hub.*
- EUPLEXIA**, *Steph.*
 Lucipara, *L.*
- APLECTA**, *Gn.*
 Herbida, *W.V.*
 Prasina, *Fab.*
 Occulta, *L.*
 Nebulosa, *Tr.*
 v. *Grandis*, *Don.*
 Tincta, *Bork.*
 Advena, *W.V.*
- HADENA**, *Och.*
 Satura, *W.V.*
 Porphyrea, *Esp.*
 Exulis, *Lef.*
 Assimilis, *Doub.*
 Adusta, *Esp.*
 Protea, *W.V.*
 Glauca, *Kleem.*
 Dentina, *W.V.*
 Peregrina, *Tr. (?)*
 Chenopodii, *W.V.*
 Trifolii, *Rott.*
 Atriplicis, *L.*
 Suasa, *W.V.*
 Dissimilis, *Knoch.*
 Oleracea, *L.*
 Pisi, *L.*
 Thalassina, *Naturf.*
 Contigua, *W.V.*
 Genistæ, *Bork.*
 Rectilinea, *Esp.*
- Xylinidæ**, *Gn.*
- XYLOCAMPA**, *Gn.*
 Areola, *Esp.*
 Lithoriza, *Bork.*
- CLOANTHA**, *Bdv.*



Perspicillaris, *L.*
Polyodon, *Clerk.*

Solidaginis, *Hub.*

CALOCAMPA, *Steph.*

Vetusta, *Hub.*

Exoleta, *L.*

XYLINA, *Och.*

Rhizolitha, *W.V.*
Ornithopus, *Rott.*

Semibrunnea, *Haw.*

Petrificata, *W.V.*
Socia, *Rott.*

Furcifera, *Hufn.*
Conformis, *W.V.*

*Lambda, *Fab.*

v. *Zinckenii*, *Tr.*

CUCULLIA, *Och.*

Verbasci, *L.*

Scrophulariæ, *W.V.*

Lychnitis, *Rambur.*

Asteris, *W.V.*

Gnaphalii, *Hub.*

Absinthii, *L.*

Chamomillæ, *W.V.*

Umbratica, *L.*

Heliothidæ, Gn.

HELIOTHIS, *Och.*

Umbra, *Hufn.*
Marginata, *Fab.*

Peltigera, *W.V.*

Armigera, *Hub.*

Dipsacea, *L.*

Scutosa, *W.V.*

ANARTA, *Och.*

Melanopa, *Thunb.*

Cordigera, *Thunb.*

Myrtilli, *L.*

HELIODES, *Gn.*

Tenebrata, *Scop.*
Arbuti, *Fab.*

MINORES

Acontidæ, Gn.

AGROPHILA, *Bdv.*

Sulphuralis, *L.*
Trabealis, *Scop.*

ACONTIA, *Och.*

Luctuosa, *W.V.*

Solaris, *W.V. (?)*

Erastridæ, Gn.

ERASTRIA, *Och.*

Venustula, *Hub.*

Fasciana, *L.*
Fuscula, *W.V.*

BANKIA, *Gn.*

Bankiana, *Fab.*
Argentula, *Hub.*

Anthophilidæ, Gn.

HYDRELIA, *Gn.*

Uncana, *L.*

MICRA, *Gn.*

Ostrina, *Hub.*

Paula, *Hub. (?)*

Parva, *Hub.*

Phalænoidæ, Gn.

BREPPOS, *Och.*

Parthenias, *L.*

Notha, *Hub.*

QUADRIFIDÆ

Variegatæ, Gn.

Plusidæ, Bdv.

ABROSTOLA, *Och.*

Tripartita, *Hufn.*
Urticæ, *Hub.*

Triplasia, *L.*

PLUSIA, *Och.*

Chryson, *Esp.*
Orichalcea, *Fab.*

Chrysitis, *L.*

Bractea, *W.V.*

Festucæ, *L.*

Iota, *L.*

V.-Aureum, *Gn.*
Pulchrina, *Haw.*

Gamma, *L.*

Ni, *Hub. (?)*

Interrogationis, *Hub.*

Gonopteridæ, Gn.

GONOPTERA, *Lat.*

Libatrix, *L.*

INTRUSÆ.

Amphipyridæ, Gn.

AMPHIPYRA, *Och.*

Pyramidea, *L.*

Tragopogonis, *L.*

MANIA, *Tr.*

Typica, *L.*

Maura, *L.*

Toxocampidæ, Gn.

TOXOCAMPA, *Gn.*

Pastinum, *Gn.*

Craccæ, *W.V.*

CATEPHIA, *Och.*

Alchemista, *S.V. (?)*

Stilbidæ, Gn.

STILBIA, *Steph.*

Anomala, *Haw.*

LIMBATÆ.

Catocalidæ, Gn.

CATOCALA, *Och.*

Fraxini, *L.*

Nupta, *L.*
 Promissa, *W.V.*
 Sponsa, *L.*

SERPENTINÆ, Gn**Ophiuidæ, Gn.****Hypenidæ, H. Sch.**

MADOPA, *Steph.*
 Salicalis, *W.V.*
 HYPENA, *Sch.*
 Proboscidalis, *L.*
 Rostralis, *L.*
 Fontis, *Thunb.*
 Crassalis, *Fab.*

SQUAMOSÆ, Gn.**Odontidæ, Gn.**

ODONTIA, *Dup.*
 Dentalis, *W.V.*

PULVERULENTÆ
[*Gn.*]**Pyralidæ, Gn.**

PYRALIS, *L.*
 Fimbrialis, *W.V.*
 Costalis, *Fab.*
 Farinalis, *L.*
 Lienigialis, *Zell.*
 Glaucinalis, *L.*

OPHIODES, *Gn.*
 Lunaris, *W.V. (?)*

Euclididæ, Gn.

EUCLIDIA, *Och.*
 Mi, *L.*

DELTOIDES.

Obsitalis, *Hub.*
 HYPENODES, *Gn.*
 Albistrigalis, *Haw.*
 Costæstrigalis, *Steph.*
 SCHRANKIA, *H-Sch.*

Turfosalis, *Woche.*

Herminidæ, Dup.

RIVULA, *Gn.*

AVENTIÆ.**Aventidæ, Gn.**

AVENTIA, *Dup.*
 Flexula, *Fab.*

PYRALIDES.

AGLOSSA, *Lat.*
 Pinguinalis, *L.*
 Cuprealis, *Hub.*

Cledeobidæ, Dup.

CLEDEOBIA, *Steph.*
 Angustalis, *W.V.*

LURIDÆ, Gn.**Ennychidæ, Gn.**

PYRAUSTA, *Schr.*
 Punicealis, *W.V.*
 Aurata, *Scop.*
 Purpuralis, *L.*
 Ostrinalis, *Hub.*

Glyphica, *L.*

Poaphilidæ, Gn.

PHYTOMETRA, *Haw.*
 Ænea, *W.V.*

Sericealis, *W.V.*
 SOPHRONIA, *Gn.*
 Emortalis, *W.V.*
 HERMINIA, *Lat.*
 Derivalis, *Hub.*
 Barbalis, *L.*
 Tarsipennalis, *Tr.*
 Grisealis, *W.V.*
 Cribralis, *Hub.*

RHODARIA, *Gn.*
 Sanguinalis, *L.*
 HERBULA, *Gn.*
 Cespitalis, *W.V.*
 ENNYCHIA, *Tr.*
 Cingulalis, *L.*
 Nigrata, *Scop.*
 Anguinalis, *Hub.*
 Octomaculalis, *L.*

Asopidæ, Gn.

AGROTERA, *Schr.*
 Nemoralis, *Scop.*
 ENDOTRICHIA, *Zell.*
 Flammealis, *W.V.*

Steniadæ, Gn.

DIASEMIA, *Steph.*
 Literalis, *Scop.*
 Ramburialis, *Dup.*

NASCIA, *Curt.*
 Ciliialis, *Hub.*

STENIA, *Gn.*
 Punctalis, *W.V.*

Hydrocampidæ, Gn.

CATACLYSTA, *H.-Sch.*
 Lemnalis, *L.*

PARAPONYX, *Steph.*
 Stratiotalis, *L.*

HYDROCAMPA, *Lat.*
 Nymphæalis, *L.*
 Stagnalis, *Don.*

Acentropidæ, Sldr.

ACENTROPUS, *Curt.*
 Niveus, *Oliv.*

Botydæ, Gn.

BOTYS, *Lat.*
 Lupulinalis, *Clk.*
 Nubilalis, *Hub.*

Pandalis, *Hub.*
 Flavalis, *W.V.*

Hyalinalis, *Hub.*
 Ruralis, *Scop.*
 Verticalis, *W.V.*

Lancealis, *W.V.*

Fuscalis, *W.V.*
 Terrealis, *Tr.*
 Asinalis, *Hub.*

Urticalis, *L.*

EBULEA, *Gn.*
 Crocealis, *Tr.*
 Verbascalis, *W.V.*
 Sambucalis, *W.V.*
 Stachydalis, *Zinck.*

Catalaunalis, *Dup. (?)*

PIONEA, *Gn.*
 Forficalis, *L.*
 Extimalis, *Scop.*
 Margaritalis, *W.V.*
 Stramentalis, *Hub.*

MARGARODES, *Gn.*

Unionalis, *Hub.*

SPILODES, *Gn.*

Sticticalis, *L.*

Palealis, *W.V.*

Verticalis, *L.*
 Cinctalis, *Tr.*

LEMIODES, *Gn.*

Pulveralis, *Hub.*

SCOPULA, *Schr.*

Alpinalis, *W.V.*

Lutealis, *Haw.*

Olivalis, *W.V.*

Prunalis, *W.V.*

Ferrugalis, *Hub.*

Decrepitalis, *H.-Sch.*

MECYNA, *Gn.*

Polygonalis, *Hub. (?)*

PLICATÆ, Gn.**Scoparidæ, Gn.**

STENOPTERYX, *Gn.*

Noctuella, *W.V.*
 Hybridalis, *Hub.*

SCOPARIA, *Haw.*
 EUDOREA, *Curt.*

Basistrigalis, *Knaggs.*

Ambigualis, *Tr.*

v. *Atomalis, Dbl.*

Conspicualis, *Hodg.*

Cembralis, *Gn.*

v. *Zelleri, Wocke.*

v. *Scotica, White.*

Alpina, *Dale.*

Paralis, *Zell.*

Gracilalis, *Dbl.*

Pyralalis, *W.V.*

Dubitalis, *Hub.*

v. *Ingratella, Zell.*

Muralis, *Curt.*

Lineola, *Curt.*

Mercurialis, *L.*

Ulmella, *Dale.*

Cratægalis, *Hub.*

Resinalis, *Haw.*

Phæoleuca, *Zell.*

Truncicolalis, *Sta.*

Angustea, *Steph.*

Coarctalis, *Zell.*

Pallida, *Steph.*

CRAMBITES.**Crambidæ, Gn.**

PLATYTES, *Gn.*

Cerussellus, *W.V.*

CRAMBUS, *Fab.*

Alpinellus, *Hub.*

Falsellus, *W.V.*

Verellus, *Zinck.*

Pratellus, *L.*

Dumetellus, *Hub.*



JANUARY, 1886.

PART LXXIII.

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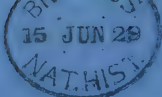
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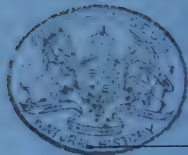
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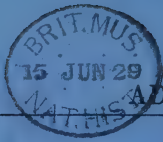
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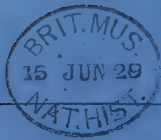
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Wm. DENISON ROEBUCK, F.L.S., and Wm. EAGLE CLARKE, F.L.S.

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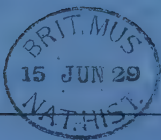
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