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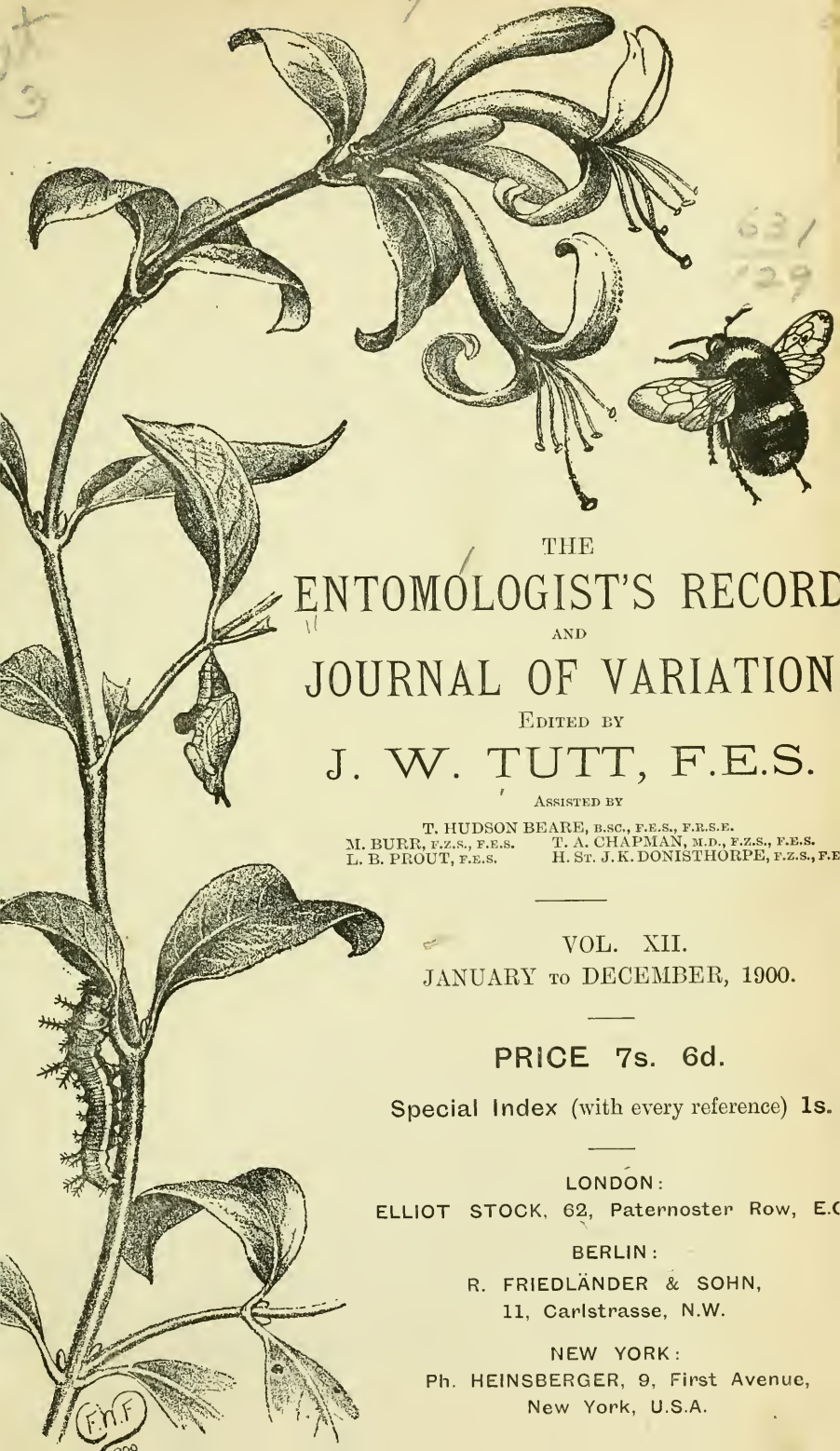

THE

ENTOMOLOGIST'S RECORD

AND

JOURNAL OF VARIATION

EDITED BY

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PREFACE TO VOL. XII.

The great help that has been given to us during the progress of this volume makes it more than usually difficult to express our thanks in anything like adequate form to all those who have in various ways aided us, but it cannot be gainsaid that their kind co-operation has resulted in achieving a greater success in this than any previous volume. The work thrown upon the assistant-editors has been perhaps rather more onerous than usual and our first thanks are due to them. It must have been a matter for congratulation to all our subscribers, as it was to ourselves, that Professor T. Hudson Beare was able to join Mr. Donisthorpe in conducting that section of the Magazine devoted to Coleoptera. We have also to specially remember those gentlemen who have helped with the illustrations—Messrs. Burr, Burrows, Capper, F. N. Clark, Donisthorpe, Morley, Dr. T. A. Chapman and the Hon. N. C. Rothschild, whilst Mr. G. B. Routledge has again prepared the "Special Index." Our thanks, however, are tendered to all those who have in any way helped us either by sending communications for publication or by introducing the Magazine to the notice of other entomologists.

We do not propose to make any change in the character of our Magazine during the forthcoming year. In this respect, if copying us is the sincerest form of flattery, we have much for which to be thankful. As, however, this is probably the last number of any British entomological periodical that will be published during this century, we take the opportunity to urge our younger enthusiasts to strive to make their work of the highest possible scientific value, and to increase the reputation of British entomologists both at home and abroad. In order to give British entomologists a brief summary of what has already been achieved, our next number, *i.e.*, the first of Vol. XIII., that which will usher in the new century, will be called the "century" number, and will contain a series of first class critical reviews by our leading specialists in the various orders—Professors Beare, Fernald, and Poulton, Drs. Chapman and Dyar, the Revs. E. N. Bloomfield and F. D. Morice, Messrs. Burr, Donisthorpe, Kaye, W. F. Kirby, Kirkaldy, Morley, Newstead, Prout, Verrall, &c. That such a number will be keenly appreciated by our readers we have no doubt, and we trust that they will make the number as widely known as possible to their entomological friends.

At the close of the century then we appeal to our contributors to make our Magazine as scientifically useful as possible, remembering that, just as we are to-day using for our generalisations the facts stored by our predecessors of a century ago, so we may reasonably feel assured that our successors will utilise our work, and that many of the incidental facts and observations reported by us will be collected and used in formulating generalisations on entomological problems of which we cannot possibly at the present time even guess, and if progress be as rapid throughout the approaching century as it has been during the last quarter of the yet present one, there can be no doubt that, whilst utilising our facts, they will consider our present biological views and our scientific methods of expression as antiquated as our leaders of to-day consider those of the entomologists of a century ago. Facts, however, cannot alter; it is these we now particularly ask our contributors to supply.

Inserts

Brunner von Wattenwyl.

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XII. No. 1. January 15th, 1900.

Brunner von Wattenwyl *(with portrait).*

With this number we take great pleasure in presenting our readers with a portrait of this most distinguished entomologist, and, as an article from his pen is to follow on p. 2, the occasion seems appropriate for a short appreciative note.

Although we are here concerned only with his work as the most eminent orthopterist of the day, it may interest our readers to know that he was born at Bern, 77 years ago, and is a member of one of the oldest Swiss families, but migrated when still a young man to Vienna, which he has since made his home. A member of the Aulic Council, he has held a very high official position, and visited England in the year 1879, as representative of the Austro-Hungarian Empire on the occasion of the International Telegraph Conference held at London.

His first important publication upon the group on which he has been for years the recognised authority, was *Orthopterologische Studien. Beiträge zu Darwin's Theorie über die Entstehung der Arten*, in 1861. It was followed in the same year by "*Disquisitiones orthopterologicae*," in which a large number of new European Orthoptera are described, and the genus *Thamnotrizon* monographed. This was one of the most important contributions to our knowledge of the *Decticidae* that had yet appeared. It was accompanied by eight plates, very carefully executed by the author, some of which are coloured, and that extremely well.

Four years afterwards he published *Nouveau Système des Blattaires*, which marked the commencement of a new era in the study of Orthoptera. This volume has been taken as a model in all later monographs, and the modern classification of the *Blattodea* has been based upon the system then first established.

An important essay, entitled *Die morphologische Bedeutung der Segmenter bei den Orthopteren*, came out in 1876, and two years later his second great monograph was published. In this the large family of the *Phaneropteridae* is exhaustively treated and the *Locustodea* are first divided into a series of families. This series of treatises, which has done more for the systematic classification of the Orthoptera than the works of almost any other author, included monographs of the *Stenopelmatidae* and *Gryllacridae* (1888), *Proscopidae* (1890), Additamenta to the *Phaneropteridae* (1891), and *Pseudophyllidae* (1894).

The *Prodromus der europäischen Orthopteren* (1882) is a complete encyclopaedia of the European forms, and although our knowledge has

materially increased in the last seventeen years, this work is still absolutely indispensable to the student of this group; in it, not only are the Orthoptera of Europe (as politically defined) dealt with, but also the species occurring in the neighbouring regions—North Africa, Syria, and Asia Minor.

In working out the rich collections made by Signor Leonardo Fea, in Burmah, he gave us, in 1893, a complete *Révision* and compendium of our knowledge of the group. This is, perhaps, his most important work, and is still considered to be the basis of the systematic work that has since been done in the Orthoptera. In fact, in working at any division of the order, the student finds this *Révision* to be indispensable. An important faunistic work on Orthoptera collected by Professor Kükenthal, in the Malay Archipelago, appeared last year, and a notable philosophic study, *Observations on the Colours of Insects*, was published at Leipsig in German and English the previous year. In it the author classifies the various systems of insect coloration, and, although everyone may not entirely agree with the views expressed therein, no thinker could read a more suggestive work.

Among the numerous, smaller essays and faunistic papers, one of the most remarkable is *Ueber hypertelische Nachahmung bei den Orthopteren* (1883), in which the author put forward his well known theory of hypertely which explains, or rather, gives a name, to the lack of explanation of phenomena which appear to the author to be inexplicable according to the accepted theories of development.

The Brunner collection of Orthoptera is probably the finest in existence; it includes among other noteworthy things, the great majority of Stal's types of the *Phasmodea*. The great Swedish entomologist based all his work on this group upon the specimens in Brunner's collection, but Brunner himself defies the student to follow out Stal's work in detail without the possession of his types. The fact that Brunner is now engaged in completing a monograph of the *Phasmodea* is, therefore, the more interesting. His vast collections are contained in a great number of cabinets, and very many species are represented also by examples in spirits.

In the summer of 1898, the writer of this memoir had the honour of spending the day in the company of the great entomologist, and nothing could have been more interesting than the veteran's reminiscences of past collecting and past students. He mentioned a strange story of a *lapsus memoriae*. A system of the *Gryllodea* published by him in 1874, enlarged and developed with due acknowledgment by de Saussure three years later, was completely forgotten in 1893, for, in his great *Révision* (p. 193), he enthusiastically exclaims, "As to the *Gryllodea*, the more I study the monograph published by M. de Saussure, the more I am convinced that it is not the system of M. de Saussure, but that of the Creator Himself." After this naïve and unstinted praise of his own work, as Dr. Krauss has pointed out, he adds three genera and nineteen species to "the system of The Creator."—MALCOLM BURR.

Note on the Coloration of Insects.*

By BRUNNER VON WATTENWYL, Hon. Fellow Ent. Soc. London.

I have devoted many years to the study of the coloration of insects,

* Translated by Malcolm Burr.

and arrived at results so interesting that I have published them in a work entitled *Observations on the Coloration of Insects*, which appeared in 1897.

My conclusion was that observed facts do not allow us to admit that this phenomenon can be attributed exclusively to "Darwinian selection," but that, on the contrary, primitive coloration is due to influences which are entirely independent of the welfare of the animal, and sometimes even contrary to its needs. The adaptation to the demands of the creature is a secondary action and this only is brought about in accordance with the laws of selection.

Naturalists, misled by Darwin's ingenious theory, shook their heads, and it was especially in England that I met the most serious opposition. My opponents did not deny the facts referred to, but raised the objection that we know too little of the various phases of the phylogenetic development of the species to be in a position to pronounce a verdict upon the utility of the qualities which we observe.

I thoroughly agree that we are far from appreciating the influence of external causes upon the modification of the species, but on a minute examination of colour, it is impossible to admit that it is the result of a slow and gradual modification such as selection demands.

Of the numerous examples referred to in my work, I choose one to illustrate my point. *Mastax semicæca*, a little grasshopper of the family Acridiodea, and a native of the Upper Amazons, is of a dark olive colour. The uniformity of this colour is broken up by a lateral yellow band of equal breadth, which runs the entire length of the insect. It begins at the head, crosses the lateral lobes of the pronotum and continues along the abdomen, regardless of the position and arrangement of the different organs. This band has caught the lower half of the eyes, and I think that the visual powers of the insect are thereby impaired. An objection could be raised that at a certain epoch the diminution of this faculty was advantageous to the insect, and there are several cases of a modification of the visual power, insects which live in caves, for example; but in these cases it can be shown that this result is obtained by a gradual obliteration of the eyes. It is the natural method responding to the action of selection. The application of a bandage is usual in the operating chamber of an oculist, but does not occur in biological genesis.

May I be allowed to add a point that is very liable to escape observation, a minute question of coloration in the front leg of *Hierodula notata*, a Mantis from Borneo? The front legs are not adapted for walking, but are used by these voracious animals as weapons for seizing their prey. When in a state of repose there can be seen in the middle of the under surface of the femur a black round spot. When the foot is extended this spot is broken. One part of the black colouring is on the femur, the other on the spines of the tibia, which, in repose, is closed against the femur. The round black spot is formed, therefore, by a combination of two organs in a certain fixed position. If this spot is produced by natural selection, and if it is developed by an action which is part and parcel of the animal, it follows that organs, entirely distinct in their nature, are made use of to produce a black spot. Further, if this spot had been misplaced by a single millimètre, it would have fallen entirely upon the surface of the femur and its production would have been far more simple. According to my theory that coloration is a property emanating from an external power that

is independent of the animal, the operation is very simple. The spot was applied to the creature, when the foot was in a state of repose, regardless of the organs which it touches.

But, what is this power which is independent of the animal? What are the laws which control it? I confess my inability to answer these questions. Many years ago (in 1873) I gave to the facts which fall into this class the name "Hypertely," that is to say, "une dépasse de la nécessité." I prefer the term which I have employed in my recent work, and I call this power "arbitrariness" of creation.

These words give a name to the facts, without aspiring to an explanation, and, I consider, with my opponents, that to-day we are far from finding one, and that we must confine ourselves to proving and setting forth facts, even when they fail to fall in with our philosophic system. And these facts multiply. There is a great charm in examining entomological collections with the object of seeking specimens of arbitrary coloration, and I beg my colleagues to give their attention thereto. I promise them a great number of interesting discoveries.—Vienna. *December* 1899.

Three seasons among Swiss Butterflies.

(*Concluded from* Vol. xi., p. 315.)

By G. WHEELER.

The season of 1899 was early and prolific. *Gonepteryx rhamni* appeared at the beginning of March, and from the 15th till the beginning of April there were constantly fresh species on the wing. On the 15th I observed *Pieris rapae* and *Argynnis latona*, on the 17th *Leucophasia sinapis*, *Euchloë cardamines*, *Polyommatus dorilis*, *Callophrys rubi*, *Brenthis dia*, *Eugonia polychloros*, *Aglais urticae*, *Euranessa antiopa*, *Vanessa io*, *Polygonia c-album*; on the 18th *Pyrameis atalanta* (the last six of course hybernated); after this a week of cold rain; then on the 27th *Coenonympha pamphilus* and *Syrichthus alveolus*; on the 28th *Papilio machaon* and *Pieris napi*; on the 29th *Nisoniades tages*, making nineteen species in March; April 3rd produced *Cupido minima* (*alsus*), and April 5th *Pieris brassicae*, *Nomiades cyllarus*, *Polyommatus icarus* (*alexis*), *Cyaniris argiolus* and *Brenthis euphrosyne*. After this a break in the weather put a stop to further appearances until the 24th, when *Colias edusa*, *C. hyale* and *C. paniscus* were on the wing, the spring brood of *C. edusa* this year being by no means scanty. The early days of May also produced *Nomiades acis*, *Polyommatus dorylas*, *P. agestis* and *Nemeobius lucina*, one specimen of *Chrysophanus phlaeas*, *Pyrameis cardui* (hybernated), *P. bellargus* (*adonis*), *Pararge megaera*, *Erebia medusa*, in the above order, and one specimen of *Cupido sebrus* ♂, the only one I have as yet seen at Veytaux. On May 19th, following the directions of a very accurate observer, Mr. A. J. Fison, I found *Brenthis selene* fairly common at "les Grangettes," between Villeneuve and Bouveret (only to be reached, however, from the former place, by a long *détour* through Noville); on revisiting the same spot on June 7th I found the species very abundant. This is a very scarce species in Switzerland, though abundant in two or three localities. At the end of May and the beginning of June I found *Melitaea artemis*, *M. parthenie*, *Erebia oeme* and *Coenonympha arcania* var. *darwiniana*, at Glion, so that a visit to Caux is no longer necessary for these species, and at the latter date

Melitaea cinxia and *M. parthenie*, with its var. *varia*, were abundant at Veytaux,—a curious fact, seeing that *varia* is as a rule a mountain variety.

Circumstances over which I had very little control caused the greater part of this summer to be passed at Sierre, in the Rhone Valley, and the one place in it where the mosquito is extremely rare. Our first visit there began on June 14th, and the following day I took a specimen of *Lycaena iolas* ♀, and during the ensuing week two ♂, all in the immediate neighbourhood of Sierre, but none of them at the famous corner which every entomologist seems fondly to believe is known only to himself, and to one other person to whom he has revealed it in the strictest confidence! It is, I am convinced, a mistake to imagine that this insect is confined to a few spots, for it is always found on the bladder senna (*Colutea arborescens*), is a strong flier and never remains for more than a minute or two at the same plant; it must therefore have a wide range of flight within the very limited area where the food-plant grows. Chanoine Favre informs me that it is less uncommon near Martigny. A visit to Visp on June 16th produced *M. aurelia* and one specimen of var. *britomartis*, but nothing else of note. *Thecla ilicis* var. *cerri* is to be taken at Sierre at this time, though not commonly. Up to this point there were but few butterflies at Sierre, and one was tempted to imagine that it was a somewhat barren locality, an idea which subsequent experience showed to be most ill-founded. A compulsory return to Veytaux, from June 27th to July 8th, did not produce any new species, though I took *Limenitis sibylla* for the first time in that locality on July 1st and a remarkable specimen of *P. icarus* (*alexis*) ♂, in which the first row of black spots within the peacock eyes on the underside forewings is prolonged into a series of dashes. This is not uncommon on the *upper* side forewings of *Chrysophanus zermattensis*, and I have taken at Bérisal a similar ♀ of *P. dorylas*, in which the 3rd and 4th spots of the under side forewings are thus prolonged the former to such an extent as to coalesce with the discoidal spot. On July 8th we returned to Sierre, and found the number of butterflies greatly increased, and amongst them some (such as *Epinephele lycaon*, *Lycaena arion* var. *obscura* and *Pamphila comma* which were very abundant) which one is accustomed to associate with the mountains; but Sierre has many mountain plants which doubtless accounts for this fact. A drive to Montana on the 11th introduced us to what would appear to be a grand hunting-ground and several species seemed abundant. I took *Coenonympha iphis* ♀, *Syrichthus fritillum* var. *alveus* and *S. carthami*, the latter exceptionally fine. But the drive down is suited only to those who are as strong as a horse, or as round and springy as an india-rubber ball, the road being incredibly bad. About this time I took *S. fritillum* (type) in the valley. It was not until July 14th that any other new species was obtained, but on that day I took a very fresh specimen of *Lycaena meleager* in the Pfynwald, the wood which extends from the Rhone bridge almost to Leuk station. I have heard more than one collector express disappointment with this famous locality, but it has always been after a search between Sierre and Pfyn, whereas the real happy hunting-ground is between Pfyn and Susten, the little village in which Leuk station is situated. On July 18th a short walk along the railway bank towards Sion resulted in excellent specimens of *Pieris daplidice*, a couple of *Cupido sebrus* ♂ and

the type ♀ of *Melitaea didyma*, which I had not previously seen. A walk in the Pfynwald, on July 19th, was memorable for the discovery of *L. meleager* in some abundance in a field of purple vetch between Pfyn and Susten, in the immediate neighbourhood of which *Apatura ilia* was abundant, though mostly somewhat worn. The type ♀ of *L. meleager* is not found in Switzerland where it is replaced by the darker and far less handsome var. *stereni*, of which at this time I found only one specimen; later, on returning to Sierre, I took two excellent specimens on August 14th, when the males were all much worn, I took, however, one good ♂ on August 16th. at Sierre. It will be seen that the dates given in Kane's *Handbook* are much too early, especially if it be borne in mind that the season of 1899 was an unusually forward one. On this date (July 19th) and subsequent days I found one or two spots in the forest where *Thymelicus actaeon* was common, but it was as usual extremely local. A visit to the vetch field and to three others in its neighbourhood on July 21st revealed the fact that *L. meleager* confined its attentions to the one in which I had previously found it; but in one of the others I took *Everes amyntas* var. *coretas*, and also the very small var. *polysperchon*, which is certainly not a *spring* variety, at any rate exclusively, my own specimens and Chanoine Favre's having been taken in the summer. In the same place I took a beautifully fresh *Dryas* var. *ralesina* and a specimen of *Papilio podalirius* var. *feisthamelii* (with nearly white wings), another specimen of which I took at Sierre a few days later. On July 22nd I took train to Martigny in search of *Lycaena amanda*, for which I subsequently discovered I was already too late, but took *E.* var. *coretas* ♀ (worn) and *Cupido sebrus* ♀. A farewell visit to the Pfynwald on the 23rd resulted in some specimens of *Apatura ilia*, and one each of *Thecla spini* and *Spilothyrus alcaeae*, both of which were taken near Leuk station.

July 24th saw a return to Bérisal, a much later one than I had contemplated. *Parnassius mnemosyne* and *Pieris* var. *bryoniae* were quite things of the past, as well as some of the blues which had been abundant at this time last year. A visit to the Steinen-alp on the following day in company with our chaplain, Mr. Fleming, was, however, very productive, *Colias palaeno* ♀, and the varieties *europomene* ♂ and the nearly white *philomene* ♀, were present in numbers, and one or two specimens of *Pieris callidice* were also obtained, though a rather high wind rendered capture difficult; but the great prize of the day fell to my lot in the capture of a very handsome specimen of *Argynnis niobe* var. *pelopia*, which has the upperside much suffused with black and the underside very strongly marked; this is, so far as I have been able to discover unique as a Swiss representative of this variety. *Melampias epiphron* was fairly abundant, *Polyommatus orbitulus* and *P. eros*, especially the former, were in astonishing numbers by the side of the stream. An expedition on the following day (by diligence) to the top of the pass showed that *Colias* var. *europomene* was in much finer condition than on the Steinen-alp, though no ♀ was to be seen; it is also much easier to catch, as it affects the comparatively even ground on the right hand side of the road, just beyond the hospice, in which spot it was abundant. My only other noteworthy capture was a specimen of *M. artemis* var. *merope* ♀, just behind the hospice. *M. epiphron* was fairly abundant, but worn, and I saw a single specimen of *Pieris callidice*. A second visit to the Steinen-alp on the 29th

resulted in two splendid examples of *C. palaeno* (type), which has far broader and blacker borders than the much commoner var. *europomene*. All four forms of this insect (two ♂ and two ♀) are to be found at the end of the Steinen-alp nearest to Bérisal, and on the lower part; my experience being that *C. phicomone*, though to be found lower, also extends considerably higher, than *C. palaeno*, at any rate in this neighbourhood. On the same day I took *Erebia pronoë* var. *pitho*—more than a fortnight earlier than in 1898. High up on the alp *Erebia mnestra* was also abundant, as also *M. epiphron*, whose var. *nelamus* I also took. *Pieris callidice* was also there in some numbers, principally at the further end of the alp, where indeed all my specimens were taken. A single specimen of *Melampias criphyle* completes the list.

Part of August 2nd and 3rd were spent at the village of Simplon, on the further side of the pass, where I was fortunate enough to fall in with Mr. Tutt and Dr. Chapman. Here *Polyommatus donzelii* was fairly common, though not one ♀ was to be seen. The type ♀ of *Chrysophanus virgaureae*, which is not found on the Brigue side of the pass, was here in abundance. I took one specimen of *Erebia mnestra* about a mile above the village. On August 5th I came across two specimens, ♂, of *Erebia gorge* var. *erynnis*, high above the fifth refuge, a spot in which Dr. Coulon informs me that he has frequently taken both this variety and the type. This is, perhaps, too great a climb for those who are not too strong, at any rate it was my last expedition at Bérisal, from which we returned on August 11th to Sierre, where *Pieris daplidice* was still abundant. An expedition on the 14th to the Pfynwald (going, as usual, by train to Leuk) resulted, as before mentioned, in two good specimens of *Lycaena meleager* ♀, and also a few specimens of *Satyrus phaedra* ♀, of which, as well as *S. statilinus* ♂, I had taken a specimen at Sierre on the 12th. On the the 18th I went over to Martigny to see Chanoine Favre's collection. This fact is worth mentioning, as it accounts for the four species in my collection which I have not taken myself, and which were given me by him. *Parnassius delius*, taken at Trient, *Lycaena amanda*, taken at Martigny (this species comes out in the middle of June, in company with *Argynnis daphne* and *Erebia stygne* (*pirene*), and is quite over by the middle of July), *Polyommatus orion*, taken near Branson, opposite to Martigny, in the middle of April (there is another brood in July, but Père Favre has taken all his specimens in April), and *Melitaea cynthia*, taken near the hospice of S. Bernard. On August 19th I took a very worn and torn specimen of *L. boetica* at Sierre, on the *Colutea*, and on the 21st, following the instruction of the Chanoine, I found the same species on the *Colutea*, near Branson. *S. statilinus* was also present in numbers, though not quite so abundantly as I afterwards found it round the tower of La Bathiaz. On the 18th, before going to Martigny, I had taken at Sierre a splendid specimen of *Colias edusa* var. *helice*, another of which I was so unfortunate (or stupid) as to miss a few days later. One more visit to Martigny, on September 1st, enabled me to secure a pair of the comparatively new fritillary, *Melitaea berisalensis*, which has, I think, been conclusively proved by Chanoine Favre to be a distinct species. This insect is to be found along the vineyard paths above the Drance, between Martigny-Bourg and La Bathiaz, a fact which I in no way feel bound to keep to myself, as it has been published by Père Favre, its discoverer. Between this date

and the 7th, when we returned to Veytaux, I haunted a patch of purple vetch, near the railway, at Sierre, on which *Colias edusa* was abundant, in hopes of finding var. *helice*, but in vain ; I took, however, several specimens of the beautiful blue ♀ var. of *Plebeius argus* known as *argyrognomon*, and two specimens of the blue ♀ var. *ceronus* of *P. bellargus* (*adonis*), as well as one specimen of *Lampides boetica*, in excellent condition, thus establishing Sierre as a locality for that species. On two of these days I was surprised to find a specimen of *Limenitis camilla* (which is fairly common in the Pfynwald in July) very little the worse for wear. On returning to Veytaux, on September 7th, I found a somewhat abundant brood of *Cyaniris argiolus*, which I had hitherto seen in Switzerland only in the spring. *Brenthis dia* was also quite fresh ; this species has at least three broods, as I have found it quite fresh in the same field at Veytaux in March, June, and September.

The new captures this year have been *P. podalirius* var. *feisthamelii*, *C. palaeno* and var. *philomene*, *C. edusa* var. *helice*, *C. hyrgaureae* ♀ type, *L. boetica*, *E. amyntas* var. *coretas*, var. *polysperchon*, *P. argus* var. *argyrognomon*, *P. bellargus* var. *ceronus*, *P. melcager* and var. *stereni*, *L. iolas*, *A. ilia*, *M. aurelia*, and var. *britomartis*, *M. berisalensis*, *A. niobe* var. *pelopia*, *B. selene*, *M. epiphron* (*cassiope*) and var. *nelamus*, *M. criphyle*, *E. gorge* var. *erynnis*, *S. phaedra* ♀, *C. iphis* ♀, *S. fritillum* and var. *alveus*, besides the four species given to me, *P. delius*, *L. amanda*, *P. orion*, and *M. cynthia*, 31 in all.

In order to give an idea of how much may be done in a small space, I append a list of the 73 species and varieties taken by myself between the village of Veytaux and the top of the first field in the Veraye gorge, the whole distance not exceeding half a mile :—*P. machaon*, *P. podalirius*, *A. crataegi*, *P. brassicae*, *P. rapae*, *P. napi* and var. *napaeae*, *E. cardamines*, *L. sinapis* and var. *erysimi*, *C. hyale*, *C. edusa*, *G. rhamni*, *Z. betulae*, *C. rubi*, *C. chryseis*, *C. dorilis*, *C. phlaeas*, *P. aegon*, *P. agestis*, *P. icarus* and var. *icarinus*, *P. bellargus* (*adonis*), *P. dorylas*, *P. corydon*, *P. cumedon*, *C. argiolus*, *C. sebrus*, *N. acis*, *C. minima* (*alsus*), *N. cyllarus*, *L. arion*, *N. lucina*, *L. sibylla*, *L. camilla*, *L. populi* var. *tremulae*, *P. c-album*, *E. polychloros*, *A. urticae*, *V. io*, *E. antiopa*, *P. atalanta*, *P. cardui*, *M. cinxia*, *M. parthenie* and var. *varia*, *M. dictynna*, *M. athalia*, *D. paphia*, *A. adippe*, *A. latona*, *B. euphrosyne*, *B. amathusia*, *B. dia*, *B. ino*, *M. galatea*, *E. medusa*, *E. ligea*, *P. maera*, *P. megaera*, *P. egeria*, *P. achine* (*deianira*), *E. hyperanthus*, *E. janira*, *C. iphis*, *C. pamphilus*, *C. arcania*, *S. althaeae*, *S. malvae* (*alveolus*), *N. tages*, *T. thaumas*, *P. sylvanus*, and *C. palaemon* (*paniscus*). It is probable that other Theclids and also *P. argus*, *E. medea*, and *S. semele* might be found there in addition, and it is certain that the nine minutes' railway journey to Glion, and the six minutes to Villeneuve, bring the following species within reach :—*M. artemis*, *A. aglaia*, *B. selene*, *E. aome* and *C. arcania* var. *darwiniana*.

Generalisations on only three years' experience are unsafe, but I think there can be no question that the visits of English collectors to this country are made, as a rule, too late in the year. In a forward, or even an average, season most species are past their prime after the first few days of August, and almost all that can be taken then might have been equally well taken a few days earlier. The vast majority of species, indeed almost all, may be found between the

middle of May and the last of July; whereas most persons choose August as the time of their Swiss tour, a month which is, except for those who come for mountaineering, in every way the least desirable of the twelve. For the botanist, the entomologist, the artist, and for all who appreciate natural beauty and grandeur, the late spring and early summer are greatly preferable.

Further notes on Tephrosia bistortata and T. crepuscularia.

By L. B. PROUT, F.E.S.

As it seems to have been a special mission of the *Entomologist's Record* for some years past to clear up the complications connected with *Tephrosia bistortata* and *T. crepuscularia*, I offer no apology for the following notes, which are designed to supplement those in *Entom. Record*, viii., pp. 76, 303.

In the first place, I sympathise with the spirit of Dr. Riding's "protest" (*Entom. Record*, x., p. 145) against the restoration of the name *crepuscularia* to Hübner's species; it certainly *is* very annoying to find that *Plebeius aegon* is the true *P. argus*, *Coremia unidentaria* the true *C. ferrugata*, and so on; and it is a corresponding satisfaction to find that evidence favours the retention of the traditional use of Linné's name of *hyale*, and that a fairly good case, at least, can be made out against Mr. Kirby's application of the name *menthastri* to our "Buff ermine." But in the case of *crepuscularia*, I really do not see that Dr. Riding has any serious ground for complaint; Stainton's *Manual*, Mr. Briggs, Mr. F. N. Pierce, and others had the name correctly applied before I wrote; and it was only a *section* of the British entomologists to whom the correction came as an innovation. Where two usages are in conflict, surely the right one is to be accepted, even by those who believe that in some cases the "law of usage should override the law of priority."

I find from some notes in *Iris*, x., pp. 58 *et seq.* (1897) that Dr. Staudinger really understands these two Tephrosias a little better than his *Catalog* led me to think. He has not even yet forgotten that Doubleday (*in litt.*) insisted on their specific distinctness, and in the note before me he admits that this is "very probable;" this is a great concession from an entomologist who inclines to "lump" *Caradrina alsines* and *C. taraxaci*, *Cerastis vaccinii* and *C. ligula*, *Cidaria truncata* and *C. immanata*, *Coremia ferrugata* and *C. spadicearia*, &c. He does not go into the question of their distinctive characters, but remarks that in all his long series of "*biundularia*" females (in Doubleday's sense) the long ovipositor projects more or less (often a long way), but only in one (Scotch) specimen of his many "*crepuscularia*." Of course this is not a very important matter, as he does not hint that the former species has actually a longer ovipositor; but I think even differences of habit are not entirely without significance when found constant, or nearly so, in a very large number of individuals. On examining my own very limited material, I find a curious result; the first brood *bistortata* and the *crepuscularia* agree very well with Staudinger's observations, but quite a number of the second brood *bistortata* protrude the ovipositor some considerable distance. Perhaps Mr. Barrett will find herein confirmation of his theory that "second brood *crepuscularia* is *biundularia*."

My next note is in the nature of a grumble. Why has Mr. Porritt, in editing Buckler's *Larvae*, vol. vii., misapplied one of the very few names which I thought were really safe and reliable—the *laricaria* of Doubleday? He has carefully kept the accounts of the two species separate, but has used the name *laricaria* for the single-brooded species and *crepuscularia* for the double-brooded (*l.c.*, pp. 37 and 35). I am afraid this cannot but increase the confusion which already exists, especially as there is little in the way of citation to guide the uninitiated as to the application.

Concerning the "var. gen. ii.," I find a less objectionable name than *consonaria*, Stph. (because not based on a misconception*) has fortunately the priority. Scharfenberg, in *Bechstein und Scharfenberg's Naturgeschichte der Schädliche Forstinsekten* (1805)—a work which has not yet been analysed as carefully as it will require to be—describes the second brood as a good species, under the name of *bacticaria*.

Concerning the dark aberrations of the two species, or of one at least of them, some discussion has recently taken place in *Societas Entomologica*, but will not disturb the synonymy. In vol. viii., p. 18 (May, 1893) Dr. Klemensiewicz describes "*Boarmia crepuscularia*, Hb. ab. *schillei* n. ab.," from Italy, as an almost unicolorous dark form with sharply-defined whitish subterminal line. Whether this really belongs to *bistortata* or *crepuscularia* is at present uncertain, but as both had been previously named it matters little; as, however, he cites it to *crepuscularia*, Hb., and gives no definite indication from which one can deduce that this is incorrect, the synonym should be written to ab. *delamerensis*. Garbowski (*l.c.*, p. 35), points out that the form has already been named *defessaria* by Freyer (cfr. *Entom. Record*, viii., p. 80); and he had already used this last as a varietal name in his *Materialen zu einer Lepidopteren-fauna Galiziens*, where, however, I take it that he is probably referring to dark *bistortata*.

I have not yet been able to investigate the Asiatic and American forms and species in this group. *Biundularia* var. *lutamentaria*, Graes. (*Berl. Ent. Zeit.*, 1888, p. 401), is a July-August form, and either a second brood of one of our British species or of a close ally. Var. ? *incertaria*, Stgr. (*Iris*, x., p. 59) is a large form taken two months earlier than *lutamentaria*, at the same place (Vladivostok, in Amurland), and probably its first brood. Staudinger indicates both as having the whitish ground colour of "*biundularia*" (*i.e.*, *crepuscularia*, Hb.), and they must be provisionally cited to that species with a ?; it is hardly conceivable that *bistortata* so far south would yield its two broods so late as the end of May and July-August respectively.

The following synonymical summary of these notes will facilitate reference; it will be noticed that the doubts which have arisen as to the identity of ab. *defessaria*, Frr., have led me to cite it with query to *both* species:

No. 1. BISTORTATA, Goeze (1781) = *albida-biundulata*, Retz. (1783) = *biundulata*, Vill. (1789) = *biundularia*, Bkh. (1794), Esp. *pro parte* (cir. 1797) = *crepuscularia*, Dup. (1829) *nec* Hb.

Var. gen. i. [*Abietaria*, Hw. (1809) *nec.* Hb. =]. *Laricaria*, Dbld. (1847) = *crepuscularia* var. A, Gn. (1857). [*Abietaria*, Hw., is a homonym].

* Probably the strictest workers at synonymy would not even allow *consonaria*, Stph., validity as a *varietal* name, seeing it is a homonym and does "not contain the type of the conception"—"*consonaria*. Hb. al. erat sp.," as Staudinger's *Catalog* would say.

Var. gen. 2. *Baeticaria*, Scharf., *Bechstein und Scharfenberg's Nat. Schädl. Forstins.*, ii., p. 638, excl. cit. (1805) = ? *crepuscularia*, Hw.(1809) *nec.*, Hb. = *consonaria*, Stph. (1829) *nec.* Hb. = *strigularia*, Stph. (1829).

? Ab. *defessaria*, Frr., 510. 1 (1847); Garbowski, *SB. K. Ak. Wiss. Math. Nat. Cl.*, ci., 1, p. 986 (1892). Unicolorous grey or grey-brown, with whitish subterminal.

Ab. *passetii*, Mieg (1886). Blackish brown.

No. 2. CREPUSCULARIA, Hb., 158 (1796) = *binndularia*, Esp. *pro parte* (cir. 1797) = *laricaria*, Buckl., *Larv. Brit. Moths*, vii., p. 37 (1897), *nec.*, Dbld.

? Ab. *defessaria*, Frr., 510. 1. (1847). Unicolorous grey with whitish subterminal.

Ab. *delamerensis*, White (1877) = *schillei*, Klem. (1893). Smoky blackish.

Ab. *nigra*, Mieg. (1886). Black, with white subterminal.

? Var. *incertata*, Stgr., *Iris*, x., p. 59 (1897). Grey-white, blackish markings more prominent than in type. Amurland (Vladivostok, Bikin), end of May.

? Var. gen. 2. *lutamentaria*, Graes., *Berl. Ent. Zeit.*, xxxii., p. 401 (1888). Smaller than type, same yellow-white ground colour, mostly weaker marked. Amurland (Isle of Askold, Sutschan, Vladivostok), cir. 27th July-7th August.

Note on Rearing Lasiocampa populifolia, Esp.

By L. J. LAMBILLION, Vice-President of the Ent. Soc. of Namur.

On July 23rd, 1898, a female *Lasiocampa populifolia* was brought to me. This had been picked up in a gutter in the town. I was very pleased, as it promised a chance of rearing the insect should I obtain fertile eggs, and I placed it on a sheet of white paper, in a box used for this purpose, and I awaited events, *i.e.*, eggs. Two days later 42 were laid, and I knew that part of the eggs had been previously laid, and those I had were fertile, for the females of this species usually lay a considerable batch. I at once sent a dozen eggs to M. l'Abbé de Joannis, in France, asking him for advice as to rearing the larvæ, for I knew that he had successfully bred the species in England some years before. On August 3rd, eleven days after the eggs were laid, the larvæ hatched, and I had 26. In its first instar the larva much resembles that of *L. quercifolia*. Like that, it is of a brown (almost black) colour, but one recognises it readily by the white spot on the 3rd segment, which, however, one only sees when the larva moves. All entomologists are agreed that this is a difficult species to rear; everything goes well until winter, but then, as soon as the larva ceases to feed, it dries up, commencing from the anus, and one sometimes sees larvæ with the posterior half of the body quite dead whilst the anterior part may live for some weeks. When one is able to procure eggs in June the larvæ are usually fullfed by the middle of August, and the imagines emerge at the end of the same month or in September, and one obtains the summer form, which is much smaller than the type, but one rarely gets this chance. Usually the larvæ hybernate very small. The chance occurred once at Saint-Servais, to M. Castin, who obtained a batch of eggs from a June ♀ one year when the spring was very warm, when from a hundred larvæ more than sixty pupated at the commencement of August, the imagines emerging at the end of the same month, whilst the remainder of the larvæ fed up slowly, but did not survive the winter. The result, therefore, was an excellent one, for this summer form is very rare, and much wanted by amateurs.

I had no reason to hope for similar success, the season was already late, and I should have considered myself one of the happiest of naturalists if a dozen of the larvæ had hybernated successfully; but even this was not to be. The dates of the four moults preceding hybernation were as follows:—1st moult, August 10th; 2nd moult, August 18th; 3rd moult, August 26th; 4th moult, September 10th. After the 4th moult the larvæ ceased to feed, although they were supplied with poplar leaves. Until this time I had kept them on a large branch of poplar, placed in a vase full of water and stood in a breeding-cage. The larvæ rested here and there on the branches, and by their bluish-grey colour and flattened form assimilated perfectly with the bark of the branches, and did not move the whole of the winter. Knowing that heat and drought were alike injurious I placed the breeding-cage in the garden, against a north wall, taking care to damp it when the weather was dry. All these precautions were in vain, and in March the larvæ began to fall from the branches, quite dried up, and by the end of the month there were only four left. Then I tried a last experiment—I planted a young poplar in my garden in a position well exposed to the sun, placed on it one of the remaining larvæ, covered it with muslin, and left it to fate. The weather was bad, but about April 10th the sun shone on the poplar a part of the day, and this appeared to waken the larva, which nibbled one of the buds at the end of the branch. Seeing this I placed the three other larvæ on the poplar, but it was already too late, for after eating a little they died, whilst the first one continued to nibble the buds, and about the middle of May, when the leaves commenced to develop, the caterpillar ate much and commenced to grow, and at the end of the month it moulted for the fifth and last time. This moult was long and laborious; the larva remained eight days without feeding, then it shed its skin and in a short time became very large, and I suspected it would prove to be a ♀ on this account. On June 20th it spun its cocoon, which is soft and greyish-yellow in colour. On the 23rd the pupa was formed and one could see it through the cocoon, and I had only to await the imago. The experiment was concluded. It is necessary to keep the larvæ in the sun even during the winter, without this precaution they will die of hunger even by the side of the leaves. On July 15th the imago emerged, a female, as I had predicted. The pupal state had lasted three weeks. The imago emerged about 8.0 a.m., and I intended to take it into the woods in the evening, in order to attract a male, but there was a heavy storm and it was impossible to go out.

As far as I am concerned there is nothing more to add. It appears absolutely necessary that the larvæ should pass the winter out of doors on a growing poplar well exposed to the sun (a precaution necessary in rearing all the Lasiocampids, each on the plant that nourishes it). It is the only possible means of obtaining a successful result. I have since learned that M. l'Abbé de Joannis was also unsuccessful in hybernating his larvæ; he kept a part of his larvæ out of doors in the winter, but not in the sun.

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

We have already shown that butterflies and moths have often been observed and captured at considerable distances from land. The habit of flying out to sea is probably much more frequent than is generally supposed. Walker reports that at Colombo, on April 20th, 1890, the forenoon being fine and hot, quite a number of butterflies came off and flew about the ship, but they were wild and difficult to approach. Among these several male specimens of *Ornithoptera pompeius* were recognised (one secured), *Papilio sarpedon*, *P. pammon*, *P. diphilus*, *P. polymnestor*, *Messarus erymanthis*, &c. Mr. Manger has an example of *Macroglossa stellatarum* taken in the Red Sea, one of *Patula macrops* in the Straits of Malacca, ten miles from land, in June, 1894, an *Ophideres fullonica* in the China Sea, 100 miles from land, both the latter by Captain Walker, *Deilephila alecto*, that came on board the s.s. Mallard in the Mediterranean, *Deilephila livornica* and *Choerocampa celerio* captured in the Red Sea, *Abraxas phantes* off Cochin China, 100 miles from land, in June, 1894, *Euchera capitata* taken in the China Sea, on the Kara, in July, 1894, by Captain Walker, and *Margarodes unionalis* captured off the coast of Algiers. We ourselves saw a specimen of what appeared to be *Pieris rapae* heading straight for the coast at Folkestone, as we were crossing to Boulogne on July 26th, 1899, when the boat was about halfway across the Straits, and there is a note (*Entom. Record*, xi., p. 297) of *Pyrameis atalanta* having been captured (many seen) in the Atlantic Ocean, some 500 miles from the Lizard. These, however, are more or less isolated examples, and it may be well to review the evidence available of larger or smaller flights of lepidoptera that have been observed on what must certainly be considered migration flights.

Kapp observes (*Naturforscher*, vi., 111) that on a calm sunny day he noticed a prodigious flight of *Pieris brassicae*, that passed from north-east to south-west, the flight lasting two hours. Kahn also records (*Travels*, i., 13) a flock of this species about halfway across the English Channel. Tindley writes (*Roy. Milit. Chronicle*, 1815, p. 452) that in Brazil, at the beginning of March, 1803, there was, for many days successively, an enormous flight of white and yellow butterflies, probably of the same tribe as the cabbage butterfly; they were never observed to settle, and proceeded in a direction from north-west to south-west, no buildings seemed to stop them from steadily pursuing their course, which, "being to the ocean, at only a short distance, they must have reached to perish." A migratory column of *Pyrameis cardui*, of from 10ft.-15ft. in breadth, was observed in the Canton Vaud (Switzerland), in 1836, the flight occupying two hours on its passage.

The reports of the lighthouse keepers, furnished to a committee appointed by the British Association for the advancement of Science, show some very definite results. Some of the extracts taken from them are as follows:—

Hanois Lighthouse (to the west of Guernsey), the extreme westerly point of the Channel Islands, in a direct line between the N.W. coast of France and the S.W. coast of England. 1882.—"June and July: Flights of *Plusia gamma*." 1885.—"September 13th: Wind S.E., sky cloudy. Silver Gamma moths all evening round lantern." 1886.—"October 31st, 8.0 p.m. A quantity of Silver Gamma moths also a few brown ones but smaller than the Gamma."

Fastnet Lighthouse, eight miles out at sea, on the coast of Co. Cork. 1883.—"November 2nd: Weather hazy; number of large moths, comparable only to a fall of snow."

Rhymes of Islay Lighthouse, situated on a rock off the south-westerly point of one of the West Scottish islands, and due north of Ireland, whence it is distant some thirty miles. 1885.—"Night of September 7th. Hundreds of moths flying about lantern."

Heligoland Lighthouse, on the east point of the island, facing Denmark, which is the nearest mainland to it, and about thirty miles from it. 1883.—"August 6th-7th: Wind south-east. Considerable flight of Silver Gamma moth (*Plusia gamma*), but nothing to be compared with the perfect 'snowstorm' of this moth that passed in the autumn of 1882, all going west. October 11th: Wind S.S.W. There was a large flight of *Hybernia defoliaria*, mixed with *H. aurantiaria*; and also during the nights of the last week in October repeated flights of these moths." 1884.—"Night of July 2nd-3rd. Thousands of *Plusia gamma*. Night of July 21st-22nd. Great numbers of *Bombyx neustria*, east to west. July 22nd-23rd. The same. 27th-28th. Numerous flights passing on."

Fiddra Lighthouse, on an island off the east coast of Scotland. 1886.—"August. Moths everywhere after darkness had set in; some very large and beautiful, and so numerous that they had to be swept down with a towel."

Would Light-vessel, ten miles off Happisburgh on the Norfolk coast. 1884.—"June 7th, 4.0 a.m., wind S.S.E. One Death's Head moth caught alive; several small white moths rested."

These records are definite enough, and, in most cases, point conclusively to the actual migration of several species besides *Plusia gamma*.

One of the records given above is sufficiently remarkable for further consideration. This is that which refers to the migration of *Hybernia defoliaria* and *H. aurantiaria*. Both these species occur in late autumn and abound in many parts of England—in fact, the former is one of the most common of the autumnal moths on the lamps, in the suburbs of London, during October and November—and both have wingless females, which could not migrate long distances under any condition whatever. *H. defoliaria*, in spite of its having a wingless female, has a great range of distribution, existing in favourable spots in the British Isles, and, extending right across the Old World to Japan, reappears again in Vancouver Island. It thus forms another connecting link between the faunas of the Palæarctic and of the Nearctic areas.

The list of lepidoptera found in the small island of Heligoland (*Ent. Mo. Mag.*, xix., p. 164) gives very interesting material for study, and the collector of the material on which the list is based, Gätke, asserts (*Heligoland as an Ornithological Observatory*, p. 87) that the movements of nocturnal lepidoptera are subject to meteorological influences, that this view is supported by repeated observations, which show that these insects travel past the island (Heligoland) under the same conditions as migrating birds, and, for the most part in their company, in an east-to-west direction. He says: "They fly in swarms, the numbers of which defy all attempts at computation, and can only be expressed by millions." To illustrate this Gätke gives the following details: "On the night of October 25th, 1872, during a very extensive migration of larks, many thousands of *Hybernia defoliaria*, intermingled with hundreds of *H. aurantiaria*, travelled over the island. In the following year, on the night of July 29th, the weather being warm and perfectly calm, thousands of *Ennomos angularia*, together with hundreds of *Gnophria quadra*, passed in the midst of a strong migration of young golden plovers, ringed

plovers, and sandpipers. Again, on the night of August 12th, 1877, during a light east wind, and very light warm rain, myriads of *Plusia gamma* migrated in company with the shorebirds already mentioned, and among young birds of the wheatear, willow warbler, and other small species. With regard to *P. gamma*, the author goes on to say, that never have the migrations of *P. gamma* reached to such an extent as they did during the middle of August, 1882. On the 15th of that month, the wind was south-east, the weather fine and warm; during the night the wind was south with a calm and warm rain. Several small birds (the redstart, whitethroat, willowwarbler, &c.), as well as plovers and sandpipers were migrating in numbers, and, intermingled with these, from 11 p.m. to 3 a.m., myriads of *P. gamma*, like a dense snowstorm, all travelling in a direction from east to west. Early on the morning of the 16th, the wind was west, with rain, the afternoon was fine, sunny and calm, and in the evening and during the night the wind turned south, when there was again a strong migration of small birds and waders, together with countless numbers of *P. gamma*. These migration phenomena were repeated during the nights of the 17th and 18th, with very light southerly and westerly winds. On the 19th, with a south-east wind and fine weather, many warblers, flycatchers, and like species were seen during the day. During the night the sky was overcast, but large numbers of waders, again accompanied by *P. gamma* in millions, were still seen, all travelling from east to west. During the night of the 20th, there was a thunderstorm at some distance, which put an end to migration of every kind." Gätke further notes here the connection between migration and electrical disturbances of the atmosphere, and observes that in this instance the migration of *P. gamma* and that of the small birds were both interrupted by thunderstorms. He repeats that he has long been convinced that the more extended flights of lepidoptera are subject to the same meteorological influences as those of birds, that in the month of July of various years he has captured numerous species of lepidoptera not belonging to the insect fauna of the island, the weather of these nights being invariably such that, if it had occurred a few weeks later, it would have conducted hither numerous wheatears. We have already noticed the great immigration of *Hybernia defoliaria* and *H. aurantiaria* that accompanied a great flight of larks on October 25th, 1872, whilst on October 12th, 1883, during an exceedingly strong period of bird-migration, large swarms of the same species of *Hybernia* made their appearance.

Pierids, *Psilura monacha*, and other lepidoptera, have been seen to pass Heligoland in migratory flights of astonishing proportions, though less than those of *P. gamma*, the numbers of which are beyond conception, and the migration of *P. gamma* already referred to as taking place between August 15th-19th, 1882, was such that, as seen from the lighthouse, they passed from east to west in undiminishing numbers, like the flakes of a dense snowstorm. Gätke states that he was informed by Cordeaux that an enormous immigration of these insects actually took place in England at a time corresponding with these observations.

Gätke's observations lead him to suppose that, in the migrations of *Plusia gamma* across Heligoland, they travel from Schleswig-Holstein and the adjacent country to Britain, across the North Sea, 400 miles in extent. The insects, he says, always follow an east to west migra-

tion, and they adhere to it with as much steadiness and precision, as the different migratory hosts of birds which are observed here; and that they accomplish their journey in safety is shown by the enormous swarms of them that frequently occur on the east coast of England, and which can only be explained as the result of an immigration. Large numbers of *Malacosoma neustria*, *Charaeas graminis*, and other species, are also represented in somewhat similar migratory swarms.

It has been suggested that these insects are attracted by the light of the lighthouse, and consequently that it is only around the latter that they are seen in such quantities; this, however, Gätke considers to be contradicted by the migrations of *Hybernia defoliaria** and *H. aurantiaria*, since large numbers of them may be found in the course of the night, as well as on the following morning, from one end of the island to the other. Gätke further points out that it is impossible that these moths should be guided by any sort of experience, acquired or inherited, during the single migration of their life, which, moreover, is performed in the darkness of night across a wide expanse of water, and even if they did these would be perfectly useless, for these migrants die shortly after their autumn migration, without having produced further offspring to which they could commit their experiences, either by hereditary transmission or personal instruction.

So far as Gätke's observations go, the flights of these insect migrants are composed exclusively of males. In the case of the *Hybernia* species, in which the females are wingless, this is, of course, as we have already shown, inevitable.

Gätke records the occurrence, on June 23rd, 1880, of a specimen of *Papilio podalirius* (in company with *Saxicola deserta*, a southern bird extremely rare in central and northern Europe), a single specimen of this butterfly alone having been previously recorded for Heligoland. The weather at the time was perfectly calm and warm. He considers that the atmospheric conditions which favoured the migration of the bird had also induced the migration of the butterfly.

* It must be remembered that this insect is very strongly attracted by light, and if it were a common sedentary moth, Gätke might have been somewhat deceived with regard to its migration.

COLEOPTERA.

Notes on the Dinoderus substriatus of British collections.—The insect in our handbooks (and in our catalogues since 1866) under the name of *Dinoderus substriatus*, Payk., really includes three species which are, moreover, not all of the same genus. Canon Fowler (*Col. Brit. Isles*, vol. iv., p. 200) writes of *Dinoderus substriatus*,* Payk., "In decayed trees; very rare; Darenth Wood (where an example was taken on the wing by Mr. G. Lewis); New Forest (Stephens); Skellingthorpe, near Lincoln (Rev. H. Matthews)." Of the insects here recorded, those from the New Forest (there are two specimens in the Stephensian cabinet) are the same species as a beetle taken by Professor Beare, in some numbers, in his house at Richmond; and the one from Darenth Wood (this is in the Power collection, labelled "Darenth, Lewis") is another species of the same genus. The

* The insect figured in Fowler (pl. 118, fig. 13) is *Stephanopachys substriatus*, Payk.

insect taken by the Rev. Matthews, near Lincoln (which is now in Mr. Gorham's collection) belongs, however, to quite another genus; it is the true *substriatus* of Paykull, is a longer and darker beetle, and has the club of the antenna perfoliate, with the two basal joints not produced inwardly, and the punctures of the elytra arranged in striæ. In "Some Observations on the Coleopterous Family Bostrichidae†" (*Ann. Mag. Nat. Hist.*, 1888, pp. 348-50) Mr. C. O. Waterhouse proposed the generic name of *Stephanopachys* for this insect, being the *Dinoderus* of many authors but not of Stephens. This name has been adopted in the last European catalogue (1891, p. 234), where the synonymy of two of these species is given as follows:—

"*Dinoderus*, Stephens—*biforcolatus*, Woll., 'Col. Hesp.,' 110 (*siculus*, Baudi., B., 1873, 336). *Substriatus*, Steph. (*nec.*, Payk.)."

"*Stephanopachys*, Waterhouse (1888)—*substriatus*, Payk., Kiesw., 30, E. *Quadricollis*, Frm., Ab., 1879, 83."

There seems to have been some doubt as to which of these two species Stephens' description of *Dinoderus* refers (see Gorham *Proc. Zool. Soc.*, 1898, pt. ii., p. 329), but it appears to me, without doubt, that he was talking about the former of these two insects, which is the species in his collection. Stephens says (*Manl.*, vol. iii., p. 252) that the two basal joints of the club of the antennæ are conic-trigonate, and produced within, the elytra retuse posteriorly and inclining to castaneous, and the length 1½ lin., all these points could only refer to the former of these insects. He expresses doubt as to whether his insects are the same as the *substriatus*, Payk., and mentions that, unlike that species, the pair he has from the New Forest have the puncta irregular and not arranged in striæ.

Mr. Waterhouse (*l.c.*) considers that the *substriatus*, Steph., is the *Apate minutus*, F.; this cannot be absolutely proved, as the type is no longer in the Banksian collection, but it appears very probable. M. P. Lesne (*Rev. d. Bostich Ann. d. France*, 1897, pp. 349-50) takes the same view, but he points out that the *minutus*, F., is not the same species as the *biforcolatus*, Woll., and, therefore, the *substriatus*, Steph., is not the *biforcolatus*, Woll. He separates *minutus* and *biforcolatus* thus:—

a. Ponctuation de la déclivité postérieure des elytres très forte, confluente, aréolaire, non distinctement ocellée au moins aussi enfoncée que celle des parties basilaires. Ecusson brillant	*D. biforcolatus*, Woll.
b. Ponctuation de la déclivité postérieure des elytres nettement ocellée, non confluente, moins enfoncée que celle des parties dorsales. Ecusson mat ..	*D. minutus*, F.

Mr. E. C. Rye (*Ent. Ann.*, 1863, p. 98) pointed out that the *Dinoderus substriatus* of Stephens was not, as had been supposed, the insect known by the same name to continental naturalists, but belonged to a different genus. He, however (*l.c.*), erroneously attributed Mr. G. Lewis' capture at Darenth to the *substriatus*, Payk. It is the *Dinoderus pilifrons*, Lesne. He separates it from the *minutus*, F. (*l.c.*, p. 322), as follows:—

a. Fovéoles médianes de l'aire postérieure du pronotum obsolètes. Region frontale hérissée sur les côtés de crins dressés, denses, assez longs	*D. pilifrons*, Lesne.

† It is much to be regretted that this paper was never recorded in the *Zoological Record*.

b. Fovéoles médianes de l'aire postérieure du pronotum bein marquées. Crins dressés de la région frontale généralement très courts et peu abondants. Ecusson deux fois aussi large que long .. .. *D. minutus*, F.

I propose that the three species shall stand in the British list thus:—

1. *Dinoderus minutus*, F. (*substriatus*, Steph.) (being the species in the Stephensian cabinet and that taken by Professor Beare at Richmond).
2. *Dinoderus pilifrons*, Lesne (the insect in the Power col.).
3. *Stephanopachys substriatus*, Payk. (Matthews' capture, now in Mr. Gorham's col.).

It is probable that all these insects are importations, *D. minutus* is found nearly all over the world, and the genus feeds on roots, corn, bamboo, and other wood, &c. I must express my thanks to Messrs. Gahan and C. O. Waterhouse for carefully identifying all these insects, and to Mr. Gorham for kindly letting me see his beetle.—Horace Donisthorpe, F.Z.S., F.E.S., 58, Kensington Mansions, South Kensington, S.W.

Coleoptera, etc., in various localities in 1899.—My entomological excursions this year outside my own district (Lea Valley and Epping Forest) have not been numerous, but I have nevertheless been able to add therefrom a few good insects to my collection. The results of two visits in May, and one in September, to the Dorking district, were:—*Chrysomela goettingensis*, not rare in moss, I was fortunate enough to find a nearly full-grown larva, which afterwards pupated, but died before reaching maturity; *Cnuthorrhynchus euphorbiae* (*crux*), one swept, there were some beautiful patches of *Veronica chamaedrys* in flower close to the spot, from which no doubt the weevil came; *Nitidula rufipes* and *4-pustulata*, a few of each, with *Dermestes murinus*, &c., out of a dead rabbit on a chalky slope; *Carabus nemoralis*, two or three out of moss—this is not in my experience a very common insect; *Cistela luperus* (1) from a guelder rose blossom; *Phyllotreta nodicornis*, several swept from some plants of *Reseda* in a lane; *Amara acuminata* (1) in moss; one each of two species of Hemiptera—*Eremocoris podagricus* and the beautiful metallic blue *Zicrona caerulea*, also turned up in moss. A day's collecting at Darenth, on June 17th, was very disappointing, so far as rarities were concerned, although I got a few more or less common species I wanted—*Molytes coronatus* (1) was met with crawling in a chalky lane, and a greenish aberration of *Rhynchites pubescens* came out of oak, with *Cryptocephalus parvulus*, in plenty, out of birch; on a mullein plant I noticed a single *Longitarsus*, but as my boxes were full, I did not take it. Mr. J. J. Walker, whom I met in the evening at Darenth village, informed me that he had taken the rare *L. patruelis* in the wood that afternoon, so that it is very probable the insect seen by me was that species. A visit to Deal on June 25th was also disappointing as regards its main object, *Saprinus metallicus*, for which I was apparently too late, while most of the specimens of *S. aeneus*, the only species of the genus which occurred, were damaged. Two of the Deal specialities turned up, however, in the shape of *Melanotus punctolineatus*, of which I found a single specimen sunning itself on a low stone wall, and *Lixus bicolor*, of which four specimens occurred on the golf links, at the roots of a large plant of *Erodium cicutarium*, in company with the Hemipteron *Pseudophlaeus falenii*. *Masoreus wetterhali*, *Dermestes undulatus* and

Hypera murina also occurred, but were all scarce. Lastly, by a visit to the Sheppey glue and chemical works, Queenborough, at the end of September, I obtained most of the special things met with there, including a series of *Carcinops* 14-*striata*, three or four *Gnathoncus nannetensis*, *Alphitobius diaperinus*, *Necrobia rufipes* and *ruficollis*; the last three species were extremely abundant, but the majority of the *Alphitobii* were damaged; *Omosita depressa*, which Mr. J. J. Walker has taken here, was not to be found. (In addition to the beetles I got a couple of the fine earwig, *Anisolabis annulipes*). I also had an hour's search in the vicinity of the town, but got nothing worth mentioning except a few specimens of *Amara convexiuscula*, at the root of *Chenopodium* growing on the sea-wall.—F. B. Jennings, F.E.S., 152, Silver Street, Upper Edmonton, N.

Coleoptera at Colchester.—I have to record the following captures in this district (Colchester) during 1899. The long drought made many of the species unusually scarce and others totally absent. Among the few things I captured were *Bembidium clarki*, in ditch rubbish; *Berosus spinosus*, in coast ditch; *Microglossa gentilis*, one only in an ant's nest; *Myrmelonia fanestra*, *humeralis*, and *laticollis*; *Staphylinus stercorarius*, on pathways; *Ocypus ater*, in seaweed; *Trogophloeus foreolatus*, in ditch rubbish; *Hister marginatus* (one) and *Amphotis marginata*, in ants' nests; *Elmis cupreus*, in a small stream; *Dolichosoma lineare* and *Malachius marginellus*, in flowers, &c., on the coast; *Hedobia imperialis* by beating hawthorn blossom; *Lyctus canaliculatus*, *Saperda carcharias*, one damaged; *Orsodacna cerasi* and *lineola*, rare; *Zeugophora flavicollis*, two specimens; *Mordellistena brunnea*, one; *Anthicus humilis*, *Erirrhinus festucae*, *Rhynchites pubescens*, *Balaninus tessellatus*, and others, including a few at present undetermined, among which I hope there may be something decent.—B. S. Harwood, Colchester.

Coleoptera in 1899.—Among other things taken early in the year, worthy of notice, are *Anchomenus livens*, out of moss, at Guestling Wood, in some numbers, and *Cryphalus fagi*, from the same locality, also in plenty. Three days in Richmond Park produced some interesting captures—a series of *Trinodes hirtus*, *Dorcatoma flavicornis*, *Anitys rubens* and *Heledona agricola**, and single specimens of *Cossonus linearis*, *Scraptia dubia* and *Athous rhombeus!* (very small); this seems to have been quite a special year for *A. rhombeus*.—W. H. Bennett, Hastings.

Coleoptera out of moss at Chobham in October.—An afternoon's work at thick wet moss on Chobham common, on October 14th, produced the following species:—*Quedius fuliginosus*, Grav., *Lathrobium punctatum*, Zett., *L. multipunctum*, Grav., *Philonthus bipustulatus*, Panz., *P. nigrita*, Nord., *Homalium caesum*, Grav., *Acupalpus dorsalis*, F., *Pterostichus minor*, Gyll., *Agabus sturmii*, Gyll., *A. femoralis*, Payk., and many others.—T. Hudson Beare, B.Sc., F.E.S., Kings Road, Richmond, Surrey.

* Mr. W. E. Sharp tells us that he took this beetle in numbers, in *Boleti*, in Windsor Forest this summer.

SCIENTIFIC NOTES.

A new British Flea.—It may interest readers of the "*Entomologist's Record*" to know that I have received specimens of *Typhlopsylla orientalis*, Wagner (*Hor. Soc. Ent. Ross.*, xxxi., p. 591., t. x., f.

30, 1898). Messrs. Brazenor Bros. sent me a series of this insect from Brighton, and Mr. William Farren a similar lot from Boxworth, Cambs. I have also received a pair from a weasel taken near Nairn.—N. Charles Rothschild, B.A., F.Z.S., Tring Park, Tring. *December 30th*, 1899.

New Psychid genera.—In order to legitimise as it were, certain names that I am using in my second volume of *British Lepidoptera*, and to prevent (as far as possible) them being reduced to synonyms prior to publication, I wish to notice the following:

(1) Genus *Bruandia*, n. gen. with type *reticulatella*, the anterior wings retieulated, the costa rounded, possessing a well-defined cellula intrusa, the anterior tibial spines short (under ·64 the length of tibia) and 20 or more antennal joints.

(2) Genus *Masonia*, n. gen. with type *crassiorella*, the anterior wings without reticulations, the median nervure not forming a cellula intrusa; the anterior tibial spines intermediate, ·66-·72 the length of the tibia, the antennal joints usually 20 or more.

The Fumeids of which *casta* is the type, will retain the name *Fumea*, Haw.

Among the Epichnopterygids, one separates readily the Bijugids and Psychideids from the Epichnopterygids proper which are without anterior tibial spines. The species thus left appear to fall into two genera, *viz.*:—

(1) *Epichnopteryx*, Hb., with (dark) unicolorous wings and well represented by *pulla*, which is the type of the genus.

(2) *Whittleia*, n. gen. with reticulated wings and well represented by *reticella*, which may be named as the type.

The extended diagnoses of these genera will of course be published in *British Lepidoptera*, vol. ii.—J. W. Tutt. *January 1st*, 1900.

Further note on Luffia ferchaultella.—In reference to my note on this species in *Ent. Record*, xi., p. 293, I wish to add a remarkable point that I had not clearly before me in writing that note. It does not in any way alter the facts then stated, but may affect some of the conclusions that may be derived from them. In observing the habits of the various Luffiid races, Mr. Bacot especially notes that whilst *L. ferchaultella* from various British localities commenced oviposition immediately on emerging from the pupa, those from Bignasco did not do so, but on the contrary, assumed a "calling" position like those of *L. lapidella*; he bred altogether six females between July 20th and 27th, as to each of which he makes this note. But he did not note whether they ultimately laid eggs or, still less, whether they were fertile. Still, his observation is abundantly adequate to show that the females expected males, and that such males must exist, however rare they may be, and that this race cannot be so completely parthenogenetic as the English examples. It is, nevertheless, true that perhaps some 200 cases were collected, that from twenty to thirty, perhaps more, ♀s were bred, together with swarms of Chalcids, and that not one male appeared, and, further that in all its anatomical points, it agreed absolutely with *L. ferchaultella* and not with *L. lapidella*, and that in the matter of variability within the *L. ferchaultella* form, especially affecting the tarsi, it occupied an intermediate position, between the two forms presented by different English races.—T. A. Chapman, M.D., F.E.S., Betula, Reigate.

British Lepidoptera, Vol. I.—Critical Notes.—I have been reading your *British Lepidoptera*, vol. i., and think it a good work. Perhaps you will not object to my mentioning a few points that struck

me on reading. (1) p. 12. Concerning number of eggs laid by moths, I think my record for *Ecpantheria scribonia* would have been interesting to add, *viz.*, 2274 (see *Can. Ent.*, vol. xxiii., p. 106). (2) On the tree (p. 113) you seem to assume that the *Castniidae* have upright eggs. Is there any proof of this? The American genus *Megathymus*, put in the Castnians by Kirby and Druce, bears no relation to them, but is a true Hesperid. (3) p. 117. In your characterisation of Megalopygids you say "*seven* pairs of abnormal prolegs." It should be *six*. The anal legs are normal without accessory pads (see *Journ. N. Y. Ent. Soc.*, vii., p. 69). (4) p. 125. "The thoracic horns of *Ceratomia*." I wish authors would stop quoting these as evidences of anything whatever. They are perfectly secondary, as I have shown, and are merely a special adaptation. *In Ceratomia* the ordinary oblique lines are replaced by rows of teeth, and the "horns" are only another manifestation of this peculiar converting of markings into structural characters. (5) p. 364. "*C. avellana* with its reversible spines on hatching." You surprise me by suggesting any homology between this and the mature structure in *Doratifera*. The two are as utterly different as it is possible to imagine. Naturally this makes you get the evolution upside down. (6) p. 365. You did not improve the synopsis by changing the last paragraph. The presence of primitive setæ and skin spines is not contradictory to my definition of "smooth," which refers to the absence of warts or their derivatives. The distinction between the *Eulimacodinae* (better *Prolimacodinae*) and *Cochlidinae* is really a sharp one. You do not seem to have apprehended it.

Warts in stage I; later primitive setæ only	*Prolimacodinae.*
No warts in any stage; strong and weak segments ..	*Cochlidinae.*

(7) pp. 122 and 365. *Hairs not stings.* I think they are stings. The shaft seems hollow, and on the removal of the cap on entering the skin the poison probably escapes (see Packard's figures). The sensation is certainly a *sting*, different enough from the Lasiocampid hairs. Do not confound Packard's "caltropes" and the detachable spines with the ordinary urticating spines of the horns. They are quite separate things.—Harrison G. Dyar, Ph.D., United States National Museum, Washington. *October* 21*st*, 1899. [This note was sent as a private criticism, not specially for publication; but I have noted the facts involved in the criticism in my own copy, and doubt not other students would like to do the same.—Ed.]

VARIATION.

Cabera pusaria ab. rotundaria and a parallel ab. of C. exanthemaria.—Some time since I beat a number of larvæ from birch, in Coombe Wood, Surrey, which I considered to be *Cabera pusaria*, and from them I bred a long series of *C. pusaria*, with a fair sprinkling of *rotundaria*, but as there were some decidedly intermediate forms I have ever since considered it to be only an aberration of *C. pusaria*. Many of the forms representing *rotundaria* were more or less crippled, and looked as if they had been somewhat dried whilst in the pupal stage, from which I thought this may have produced the difference in shape and possibly in markings also.—A. W. Mera, 79, Capel Road, Forest Gate, E.

Some years ago I bred a number of *C. pusaria* from eggs obtained

from a typical ♀, taken in Yorkshire (♂ parent unknown), and among them were two or three specimens of *rotundaria*, so that I consider it merely an aberration and not entitled to specific rank.—T. Maddison, F.E.S., South Bailey, Durham.

As bearing on the question of *Cabera pusaria* ab. *rotundaria*, I may say that one of my sons took in the New Forest, in 1892, an aberration of *C. exanthemaria*, which runs somewhat parallel to the *rotundaria* form of *C. pusaria*. The wings are rounder and more ample in proportion to their length than in the type, and are divided into three almost equal spaces by the strongly marked transverse lines. There is no trace of a third line. The aberration is a striking one, because the outer transverse line is deeply shaded and the inner one, which in the forewings is also shaded but not so deeply, has a dark blotch in it near the costa.—J. C. Moberly, M.A., F.E.S., 9, Rockstone Place, Southampton.

Aberration of Zonosoma porata.—I captured this year, in Devon, an aberrant *Zonosoma porata*, in which the transverse lines on both fore- and hindwings form distinct broad fasciæ, in which the white spots stand out in bold relief.—B. A. Bower, F.E.S., Langley, Eltham Road, Lee, S.E. *October 14th*, 1899.

NOTES ON COLLECTING, Etc.

Lepidoptera from Surrey and Epping, 1899.—As I had never tried the Dorking district, and had heard a good deal about the beauty of the Surrey scenery, my father and I made several excursions there during the past season. The country undoubtedly is lovely, but we were disappointed in the insects, the best part we visited being round Friday Street, which is, to my mind, the most picturesque piece of country as well, with its miniature lake and pine clad hills round, and a few old-fashioned cottages about, but as it is situated about four miles from any railway station it can scarcely be termed convenient. Our first expedition was April 19th, to Boxhill for a few hours, but a few *Orrhodia vaccinii*, at treacle, were the only insects seen. Four days later we worked from Gomshall to Dorking, *viâ* Deer Leap Wood and Evershed's Rough, but only obtained a few larvæ of *Rumia lutcolata*, *Cidaria russata* and *Larentia didymata*, the two last by sweeping the bilberry (*Vaccinium myrtillus*) which grows in the utmost profusion, and later on in the season at a considerable height, in Deer Leap Wood. May 14th we spent the whole day working from Dorking, *viâ* Friday Street and Abinger to Gomshall. The day was warm but dull, and rain came on about 4.0 p.m. By beating the junipers which abound near Friday Street a large number of *Eupithecia sobrinata* larvæ was obtained; they varied much, but the green variety was much more numerous than the brown. Larvæ of *Nola cucullatella*, *Diloba caeruleocephala*, *Metrocampa margaritaria*, *Thera variata*, *Cheimatobia brumata*, *Hypsipetes elutata* and *Miselia oxyacanthae* were beaten, whilst more *Larentia didymata* were swept from bilberry. A few *Pieris rapae* were seen on the wing, but *Melanippe subtristata* and one *Scotosia dubitata* were the only other imagines noticed. May 20th-22nd was also spent at Dorking. The additional larvæ were *Porthesia auriflua*, *Boarmia repandata*, *Pseudoterpna cytisaria* (Gomshall), and *Chesias spartiata* (Gomshall), the latter abundant, *Oporabia dilutata*, *Hybernia defoliaria*, *Hypena*

proboscidalis, *Xanthia silago*, *Epunda viminalis* and *Anchocelis rufina* (one, at Friday Street). *Gonepteryx rhamni*, *Pieris rapae*, *P. napi* and *Coenonympha pamphilus* were the only butterflies seen. *Hepialus lupulinus*, *Anticlea derivata*, *Melanippe fluctuata* and *M. subtristata* were noticed on palings, and *Tephrosia crepuscularia* (*biundularia*) on a pine trunk at Friday Street. *Drepana cultraria*, *Venilia maculata*, *Lomaspilis marginata*, *Fidonia atomaria*, *Ligdia adustata*, *Macaria liturata*, *Asthena candidata*, *Cabera pusaria* and *Ephyra trilinearia* were also taken.

As we were desirous of becoming better acquainted with Epping Forest, where we have scarcely done any collecting, we spent a whole day there (May 31st), walking from Loughton through Monk's Wood to High Beech and the King's Oak and back. The day turned out very hot and we were fairly successful, the chief drawback being our inability to obtain something decent to eat. A female *Dasychira pudibunda* was taken at rest on a tuft of ling, from which we obtained a large number of ova, but the larvæ from them all died. A nice specimen of *Nola cristulalis* was boxed from a beech trunk in Monk's Wood, resting head downwards. *Drepana binaria*, *D. cultraria* and *Ephyra trilinearia*, the former from oak, and the two latter from beech, were beaten out in profusion, but the "hook-tips" were very difficult to keep an eye on, flying first in the sun and then in the shade, and zigzagging among the trees. *Halias prasinana* were beaten at the back of the "King's Oak." *Bapta temerata* and *Coremia propugnata*, were taken in Monk's Wood, whilst *Venilia maculata*, *Fidonia atomaria*, *Panagra petraria* and *Eubolia palumbaria* were abundant in the open. *Euclidia mi* and *Phytometra viridaria* (*aenea*), were also seen. Among the butterflies a few good *Syrichthus malvae*, which were in beautiful condition, were the only ones worth taking. At dusk *Cilix glaucata*, *Odontopera bidentata* and *Hypena rostralis* were taken, and *Panagra petraria* swarmed. Larvæ were very abundant, *Cheimatobia brumata* being an easy first in point of numbers. The following were taken:— *Nola cucullatella*, one *Hylophila bicolorana*, *Porthesia auriflua*, *Diloba caeruleocephala*, *Crocallis elinguaria*, *Himera pennaria*, *Metrocampa margaritaria*, *Hemithea thymiaria*, *Abraxas grossulariata*, *Hybernia rupicapraria*, *H. aurantiaria*, *H. defoliaria*, two *Chesias spartiata*, *Epunda viminalis* and *Miselia oxyacanthae*.

On July 9th, whilst walking to North Dulwich station, en route for Dorking I picked up a female *Zeuzera pyrina* from the pavement in fair condition. Arrived at Dorking with a small party of friends we proceeded to Ranmore, where we spent the day. Rhopalocera were not abundant, a few good *Cupido minima* being the only ones worth taking. *Enodia hyperanthus*, *Thymelicus thaumas* and *Pamphila sylvanus* were noticed. Of moths the best were *Anticlea sinuata*, *Scotosia vetulata* and *Asthena luteata*. *Cidaria fulvata*, *Eubolia bipunctata*, *E. palumbaria*, *Ligdia adustata*, *Iodis lactearia*, *Pseudoterpna cytisaria*, *Hecatera serena*, *Aplecta nebulosa*, *Miana furuncula*, and worn *Phytometra viridaria*, were also seen. Only a few minutes were available for treacle, as visions of the disappearance of the last train haunted us, and in that time *Thyatyra batis*, in beautiful condition, *Aplecta nebulosa* (several) and *Rusina tenebrosa* were taken. The vision of the last train disappearing was unfortunately rather more than a vision on this occasion, which was all the more annoying as the collecting ground was too far off for us to care about returning to it.

Cerigo matura was common at Herne Hill at light during July.

September 10th, was spent at Gomshall where larvæ af *Macaria liturata*, *Fidonia piniaria* and one *Thera variata* were beaten from pine and *Eupithecia nanata* and one small *Anarta myrtilli* from ling. *Thera variata*, and *Phlogophora meticulosa* (1 of each) were the only moths and *Pyrameis atalanta* and the "Whites" the only butterflies. Treacle only produced *Noctua xanthographa*, *Triphaena pronuba*, *T. orbona* and *Amphipyra pyramidea*.—F. M. B. Carr, 46, Handen Road, Lee, S.E.

Notes from Llanstephan, S. Wales, 1899.—From August to October this district has been visited by a perfect plague of *Pieris brassicae*. The larvæ have completely destroyed the cabbages in every garden, leaving nothing but the bare stalks, acres of turnips have likewise been defoliated, the larvæ swarming over everything in all directions, whilst walls and sides of houses now show the pupæ in every niche and corner, and countless little heaps of ichneumon cocoons. [N.B.—The parasites appear to have been equal to the occasion.] The natives are filled with wonder at this extraordinary invasion, never having seen anything of the sort before. On interrogating a farmer as to the cause of the destruction of his turnip crop, he told me that it was some sort of worm that had done all the mischief. I explained to him that these worms were the progeny of the white butterfly, and that in their turn they would develop into white butterflies; he answered nothing, but gave a pitying smile. It will be interesting to note the result of this excess on the coming season. It may, indeed, be in this way that vast migrations have their origin, and should such migration take place *P. brassicae* will be no more in evidence next year than usual. The abundance of the insect, in the first place, may be due to the same cause, *viz.*, immigration, but on this point I am by no means sure, indeed rather favour the following solution. The late summer itself has been an extraordinary one, remarkable for excessive heat and drought, conditions most favourable to the young larvæ, for nothing, in my opinion, is more destructive to exposed larvæ than rain, they are either drowned outright or washed off the leaves, and being too feeble to regain their food-plant perish in numbers. Should this theory be correct it is easy to understand that a double- and treble-brooded insect would increase in incredible numbers, and it is perhaps fortunate that these combined favourable conditions occur but rarely. I have little doubt that the vast migrations of insects may be attributed to local abnormal conditions of atmosphere, &c. *P. rapae* was also excessively abundant. *M. stellatarum*, more numerous than I have ever noticed it before. This insect appears to have been very general all over the country, and this fact may have afforded entomologists an opportunity for a closer study of its habits, which seem to be but little understood. Its times for appearance are so erratic, and the whereabouts of the larvæ, to me, are a sealed book, though always on the watch I have never yet come across the caterpillar. In these parts there is no *Galium* on the "shingle," and the common species of "bed-straw" died down and withered up before the summer was half over, and yet *stellatarum* was to be seen every day during August, September, and part of October. On September 5th I noted *Colias edusa*, *Pyrameis atalanta* was most plentiful, *P. cardui* also seen. *Aglais urticae* has been scarce, and *Vanessa io* not observed.

Chrysophanus phlaeas everywhere, continuing up to date.—C. Bingham Newland, Llanstephan, Carmarthen.

Lepidoptera at Tenby in 1899.—I spent a fortnight at Tenby in June last, arriving there on June 12th. The first thing that attracted my attention was *Anthrocera filipendulae*. Mr. Tutt wrote about this species some time ago, and stated, if I remember rightly, that there were two broods if not two distinct species, and that the first brood was generally found inland and in fields.* The brood I found on June 13th was confined to a small bit of the cliff, not common, but I managed to capture a few flying over valerian. Insects were not so common at sugar as I have known them, but they were fairly plentiful. *Mamestra albicolon* was scarce, but in fair condition, whilst *Agrotis ripae* and *Leucania littoralis* were fairly plentiful, the former in poor condition, the latter just out, so that *A. ripae* appears to be an earlier insect than *L. littoralis*. I captured a few nice aberrations of *A. exclamationis* and *A. cortica*, but little else, with the exception of *A. trifolii*, which was very plentiful in a marshy field, although I only secured two or three confluent aberrations. *Cupido minima* was found on the railway banks, but was very scarce.—(Rev.) E. C. Dobree Fox, M.A., Castle Moreton Vicarage, Tewkesbury.

Collecting in the Chilterns.—In the *Ent. Record* (vol. xi., pp. 98 and 192) I gave a short account of some entomological rambles in the neighbourhood of Kimble, Bucks. I revisited my particular hunting ground on two occasions last year (1899), and made one or two additions to the list of insects already enumerated. On July 8th—a splendid day—I found *Argynnis adippe* just emerging, and for the first time discovered *Pararge egerides* in the beech-wood glades. On August 3rd —again a grand day for collecting—*A. adippe* was pretty well over, but I found the woods, which I had not previously explored at this time of year, tenanted by *Dryas paphia*. On the chalk downs *Argynnis aglaia*, rather the worse for wear, with *Pamphila comma* in attendance, put in a welcome appearance, while *Polyommatus corydon* simply swarmed everywhere, with the August broods of *Pieris napi*, *Gonepteryx rhamni*, and *Polyommatus astrarche*. Of *Melanargia galatea*, however, on neither occasion did I find a trace.—H. Rowland Brown, M.A., F.E.S., Oxhey Grove, Harrow Weald.

Autumnal collecting.—During August last Mr. Bower paid me a visit, and we spent most of our time (from the middle of the month) after Micros, sugaring, however, one or two nights on Dawlish Warren. We took several *Argyresthia anderreggiella* and *Coriscium sulphurellum* by beating apple-trees, with a few *Peronea cristana* and *Harpipteryx horridella*. *Peronea schalleriana* and *P. comparana* swarmed—surely these must be one species! Their habits are entirely similar in every way, and sometimes it is hard to tell to which a particular specimen belongs, the only difference seems to be in colour. Has the point ever been settled by breeding? In an oak wood, where the trees were half dead and much

* This hardly states my opinion, as I certainly do not think there are two broods of *A. filipendulae*. All I know of the subject is published in *British Lepidoptera*, vol. i., pp. 526-530 and pp. 532-538. It will be seen on p. 538 that *hippocrepidis*, St., to which Mr. Fox appears to refer as the "first brood," has several coast habitats. It does not, however, appear to have been recorded from Tenby.—J.W.T.

covered with lichen, we found a good locality for *Teleia humeralis*, and in the same place got several *Sarrothripa undulanus* and a large number of *Leptogramma literana*. Other species taken during his stay in this way were *Carpocapsa splendidana*, *Teras contaminana*, *Peronea variegana*, *Cerostoma radiatella*, *C. sylvella*, *C. lucella*, *Paedisca profundana*, *P. solandriana*, *Tortrix corylana*, *Grapholitha penkleriana*, *T. heparana*, *Peronea ferrugana*, *Grapholitha naevana*, *Teras caudana*, *Argyresthia semitestacella*, *A. goedartella*, *A. brockeella*, *A. albistriae*, *A. semifusca*, *Tischeria marginea*, *Pteroxia mucronella* (1), *Gelechia rhombella*, *Chelaria hübnerella*, and others. Whilst we were after *Callimorpha hera* we saw two or three *Colias edusa* and one *Eugonia polychloros*. Sugaring on the Warren gave *Caradrina ambigua* in plenty, *Agrotis vestigialis*, *A. puta*, *A. tritici* (not common), *Peridroma saucia*, *P. suffusa*, *Miana bicoloria*, *Hadena dissimilis*, *Mamestra abjecta*, *Hydroecia nictitans*, *Acidalia marginepunctella*, *Gelechia diffinis*, *Lita salicorniae*, &c. Thatch produced *Depressaria nervosa*, *D. albipunctella*, *D. chaerophylli*, *D. arenella*, *D. ocellana*, *D. ultimella*, *D. badiana*, *D. applana*, *D. heracleana*, *D. propinquella*, *Anybia langiella*, *Coriscium brogniartellum*, and *Phyllocnistis suffusella*. During September and October I had eight pupæ of *Acherontia atropos* brought me, which were dug in a potato field here. Three emerged without forcing on September 22nd, September 29th, and October 29th. On the morning of November 9th I found *Pyrameis atalanta* in the trap, this being the second time I have taken this insect at light. I have also, among the Rhopalocera, taken at light *Pyrameis cardui*, *Zephyrus quercûs*, and *Polyommatus icarus*. Autumn sugaring has been very poor this year—very few *Tiliacea aurago*, no *Anchocelis rufina*, hardly an *Orthosia pistacina* or *Orrhodia vaccinii* to be seen. Light also was bad, only three *Asteroscopus sphinx* until November 9th, and hardly any of the usual autumn things.—E. F. C. Studd, M.A., F.E.S., Oxton, near Exeter.

While at Southend, in September last, I treacled pretty regularly. *Anchocelis lunosa* was fairly common. Of *Orthosia pistacina* I took some nice forms, and captured about ten *Peridroma saucia*. I took a pretty form of *Plusia gamma*, smaller than the type, and very pale. *Catocala nupta* appeared occasionally, and of *Noctua glareosa* I took a couple.—A. Robinson, F.E.S., Chislehurst.

Autumnal emergence of Acherontia atropos.—I had three *Acherontia atropos* brought to me during the first week of October. One had emerged but was crippled; one has since emerged and one I am afraid is dead.—E. A. Bowles, F.E.S., Myddelton House, Waltham Cross, Herts.

Abundance of Macroglossa stellatarum and Pyrameis atalanta.—I noticed in the autumn large numbers of *Macroglossa stellatarum* in South Devon, and found a larva on Dawlish Warren, which fed on till mid-October. *Pyrameis atalanta* was very plentiful at the end of September and beginning of October in the Waltham Cross district.—Ibid.

Platyptilia cosmodactyla (acanthodactyla) in Middlesex.—In the *Entomologist*, vol. xxiv., p. 94, is a record of this insect in Middlesex, and as it was then, apparently, the only one, further particulars may be interesting. In ? August, 1877, when my brother and I were collecting plants and insects in a lane in Chiswick, he stopped to examine a plant of *Geranium rotundifolium*, which, though rather rare

generally, used to grow in a few spots here. On this plant he found two plume larvæ, which subsequently produced two dark reddish specimens of the above species. These were exhibited at the last meeting (November 23rd, 1899) of the South London Entomological Society.—A. Sich, F.E.S., "Brentwood," 65. Barrowgate Road, Chiswick.

Winter capture of Gonoptera libatrix.—On the night of December 25th, I was rather astonished, when a friend had entered my house, to notice a specimen of *Gonoptera libatrix* resting on the sleeve of his overcoat. This insect was promptly bottled, and proved to be a ♀, in as fine condition as if bred. The time was about 8.30 p.m., and a thermometer hanging outside registered twenty degrees of frost at the time of capture.—James C. Haggart, 58, St. Andrew Street, Galashiels, *December 27th*, 1899.

Phigalia pilosaria on New Year's day.—A male example of the above species is the first insect of the year 1900 that I have had the pleasure of taking, it was at rest on an oak-tree. The appearance of this insect two months at least before its time seems singular.—Chas. B. Antram, 54, Elgin Road, Addiscombe, Croydon. *January 1st*, 1900.

CURRENT NOTES.

The proposed officers and council of the South London Entomological and Natural History Society for 1900 are as follows—President: W. J. Lucas, B.A., F.E.S. Vice-Presidents: H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S., and A. Harrison, F.C.S., F.L.S., F.E.S. Treasurer: T. W. Hall, F.E.S. Librarian: H. A. Sauzé. Curator: W. West. Hon. Secretaries, Stanley Edwards, F.L.S., &c. (corresponding), and H. J. Turner, F.E.S. (report). Council: R. Adkin, F.E.S., W. J. Ashdown, Dr. T. A. Chapman, M.D., F.E.S., J. N. Clark, H. Moore, F.E.S., A. M. Montgomery, and J. W. Tutt, F.E.S.

A meeting of the members of the Entomological Club and their friends was held on December 4th, at "Wellfield," Lingard's Road, Lewisham, when Mr. R. Adkin and Mrs. Adkin were host and hostess for the evening. To those who have previously had the pleasure of being present at these delightful meetings one need hardly say that the whole affair was an unqualified success. Among those who sat down to supper were Professor Armstrong, Messrs. C. G. Barrett, Carrington, Distant, S. Edwards, Enock, A. Harrison, A. H. Jones, McLachlan, Porritt, Smith, Turner, Tutt, Verrall, and J. J. Walker. After supper Mr. Adkin briefly proposed "The Entomological Club," referring to the loss the club had sustained in the death of its oldest member, the veteran entomologist, Mr. S. Stevens. The earlier and later parts of the evening were spent in informal talk and the discussion of many interesting entomological problems.

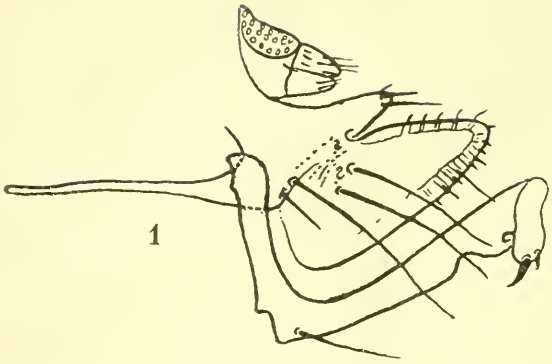
The proposed officers and council of the Entomological Society of London for the year 1900 are as follows—President: George H. Verrall, F.E.S. Treasurer: R. McLachlan, F.R.S. Secretaries: J. J. Walker, F.L.S., and C. J. Gahan, M.A., F.E.S. Librarian: G. C. Champion, F.Z.S. Council: C. G. Barrett, F.E.S., T. A. Chapman, M.D., F.Z.S., W. L. Distant, F.G.S., H. St. J. K. Donisthorpe, F.Z.S., F.E.S., F. du Cane Godman, M.A., F.R.S., A. H. Jones, F.E.S., R. W. Lloyd, F.E.S., Hon. W. Rothschild, D.Sc., M.P., F.E.S., C. O. Waterhouse, F.E.S., and E. Saunders, F.L.S.

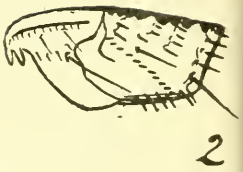
In the *Ent. Mo. Mag.* for December Mr. Harold Bailey records the capture of *Anitys rubens* and *Dorcatoma chrysomelina*, at Manchester, in a rotten oak. It is curious that these two species often occur together. Mr. W. H. Bennett has twice taken them together in Richmond Park, as also in the Hastings district. Mr. J. H. Keys records the capture of a pair of the rare and local *Carabus intricatus*, in 1898, from its old locality near Plymouth. Mr. E. A. Newbery considers that *Leptidia brevipennis* should have a place in the British list, having as much right to one as such things as *Rhizopertha pusilla*, *Lasioderma serricorne*, &c. In this we quite agree with him. In mentioning the different records he omits the one referred to in the "Notes on the British Longicornes" (vol. x., p. 246). The specimens here recorded occurred in plenty, in company with *Gracillia minuta*, in a basket-work hamper, which Mr. Bennett had for packing purposes. Mr. Bennett was only able to trace the hamper as far as Ore, where it belonged to a greengrocer.

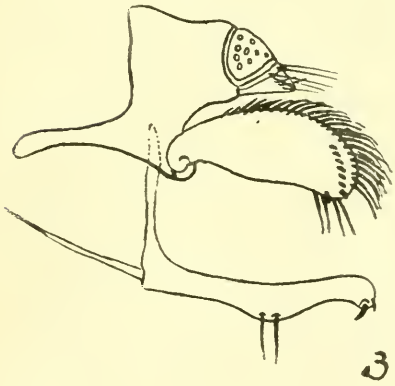
Entomologists will hear with regret that Mr. J. J. Walker, one of the popular secretaries of the Entomological Society, has been ordered abroad. His address for the time being is H.M.S. Katoomba, New South Wales. Capt. E. W. Brown, too, has gone with his regiment to Malta. We may be quite certain that entomology will not be neglected by either if opportunity should occur.

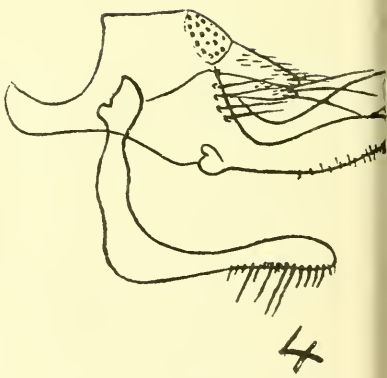
REVIEWS AND NOTICES OF BOOKS.

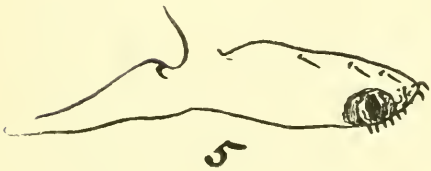
Transactions of the City of London Entomological and Natural History Society, 1898.—[Published by The City of London Entomological Society, the London Institution, Finsbury Circus, E.C. Price 2s.].—This is certainly one of the most important volumes yet issued by The City of London Entomological Society. Besides the many interesting notes in the reports of the ordinary meetings there are several papers which are of great importance to entomologists. Of these "Some heredity experiments with *Coremia ferrugata*, Linn.," by Mr. Prout, and "Beetle coloration," by Mr. H. Heasler, take the first place. The latter is of especial importance as suggesting that there are coleopterists in this country who understand that there is some science, apart from systematic work, to be got out of "beetles," whilst "Cicadides," by Mr. Quail, "Notes on the Broads," by Mr. H. Fuller, and "Chrysanthemums," by Mr. Riches, are also interesting. The best thing in the volume will possibly, by many, be considered to be the first instalment of "The Fauna of the London District," compiled by Dr. F. J. Buckell, and brought up-to-date by Mr. Prout. That Mr. Prout has seen it through press is a sufficient guarantee of its accuracy, and the combined names of the authors a sufficient guarantee of its general excellence. The "Entomologist Synonymic List," is followed and the species to *Nonagria geminipuncta* have been dealt with. We have no doubt that many records for the remaining Noctuids, the Geometrids, Pyralids, &c., will be sent to Mr. Prout now that the list is actually in hand and partly printed. London lepidopterists should remember that every little helps in the compilation of any faunistic work, and that the importance of this and similar lists depends on the accumulation of the little scraps that each individual can add.

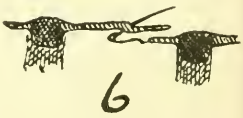












New Exotic Fleas.

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XII. No. 2. February 15th, 1900.

Bulgarian Butterflies.

By MARY DE LA B. NICHOLL, F.E.S.

Bulgaria is a very interesting district to the collector, as it has scarcely been explored at all by western entomologists, and the higher mountains are generally difficult of access. The people are quiet and civil, brigandage being practically extinct; but I could not have travelled in the remoter regions of the Rhodope alone; and the success of the expedition is entirely due to Mr. H. J. Elwes, to whose experience of camping out in wild places, and amongst rough people, I owe the pleasantest and the most original tour that I have ever accomplished. As, however, Mr. Elwes could not leave England before the middle of June I collected alone in the more accessible parts of the country for nearly a month before he joined me. I had letters of introduction to Mr. Elliot, our Minister in Bulgaria, to Mr. Freeman, our Vice-Consul at Sofia, and Dr. Leverkühn, the very capable head of the museum at Sofia. This is a most interesting and well arranged institution, and contains good *local* collections of the birds and fishes of Bulgaria. It deserves the attention of any naturalist visiting Sofia, though the Rhopalocera are scarcely represented there (excepting such as are destructive to trees or plants). Prince Ferdinand has, I believe, a fine collection of butterflies, but that remains at Vienna. From these three gentlemen I received much kindness and useful information, and from the Bulgarian Government I had an "open order," which we several times found useful in difficulties.

May 21st I made an excursion with a local entomologist to a village in the valley of the Ister, on the south-eastern slopes of the Vitoch. This is a great mountain, over 6000 feet high, rising rather abruptly due south of Sofia—a long flat-topped mass of granite, with slopes well clothed with wood, looking as if it ought to be good collecting ground, which, however, is not the case, the list of local butterflies being rather a scanty one. We hunted some rough dry slopes behind the village, too much cultivated and too hardly grazed to be very productive, and then came down into good wet fields. I give the principal items of our bag, as it was the only occasion on which I collected near Sofia:—*Parnassius mnemosyne*, *Pieris napi*, *Colias edusa*, *Thecla rubi*, *Chrysophanus dorilis*, *C. thersamon*, *C. phlaeas*, *Lycaena argiades*, *L. icarus*, *L. bellargus*, *L. aegon*, *L. semiargus*, *L. astrarche*, *Pyrameis cardui*, *Syrichthus malvae*, *S. alveus*, and several of the commoner Melitæas, &c.; all these tolerably plentiful.

Next day I took the train and travelled about 150 miles eastwards, to Slivno (or Sliven), in Roumelia. There I met the well known collector, Joseph Haberhauer, whom I had engaged to accompany me during my travels in Bulgaria. He is now an old man of 72, but still a keen collector, and probably the only person who knows anything of the Bulgarian butterflies. He has lived for many years at Slivno, and is well acquainted with that district; he has also collected during one summer (25 years ago) around the Rilo monastery, in the Rhodope, but could not give me much information as to other parts of the country. I lodged in his house for a fortnight.

Slivno is a large rambling town of 30,000 inhabitants, built quite in the Turkish fashion; it is situated in a very warm corner, on the southern side of the east Balkans, surrounded by vineyard-hills, low and gently sloping to the south and west, but rising abruptly to a height of over 3000 feet to the north and east. The vineyards are mostly ill-cultivated, and many are left half wild—a state of affairs which suits the lepidoptera remarkably well. Higher up than the vineyards are stony pastures (over-grazed by sheep and goats) and rough oak scrub, which covers the northern slopes of these mountains so thickly as to be practically impassable except by the beaten tracks. Roads there are none to speak of. The geological formation of the lower hills is sandstone, to the west and south of the town, and water is very scarce there. But the ridges northwards and eastwards are gneiss, mica, or, granite, with precipitous sides, rocky gorges and abundant springs. The Tschatalka is the most remarkable point near the town.

May 23rd I tried the vineyards near Slivno, in hopes of getting *Thais cerisyi*, but it was yet too early for it, and I saw none. I got some nice insects in a little rough valley among the vineyards, of which the best were *Coenonympha leander* and *Lycaena anteros* ♀, both just out of chrysalis. I also took *Pieris daplidice*, *Colias hyale*, *Thecla rubi*, *Melitaea cinxia*, *M. didyma*, *M. phoebe*, *Argynnis lathonia*, *A. euphrosyne*, *Lycaena cyllarus*, *L. eumedon*, *L. bellargus*, *L. argiades*, *L. baton*, *L. astrarche*, *L. iolas* (very common), *Pararge maera* (very dark and rather small), *Syrichthus malvae*, *S. alveus*, *S. orbifer*, *Nisoniades tages*, and many moths.

Next day, May 24th, I went up one of the sandstone hills, west of the town, called the Türkenwald, about 2200 feet high, and found very good collecting ground on the top and higher slopes, nice open glades covered with rough grass, heath, and flowering plants, and well sheltered by low trees or thick oak scrub. *C. leander* swa med among the bushes; on the top *Erebia medusa* var. *cumenis* was flying in great numbers, and *L. eumedon* with its var. *fylgia* was common on the blossoms of *Geranium sanguineum*. Besides these I took one specimen of *Melitaea trivia*, two of *M. cinxia* ♀, in which the ground colour of the wings was almost white, many *Argynnis niobe* var. *eris*, *Aporia crataegi*, *Anthocaris belia* var. *ausonia*, and most of the insects of yesterday's bag. I was also lucky enough to catch a splendid example of *T. cerisyi*, just out of chrysalis, as I was returning to the town. May 25th was rather cloudy, so we hunted the vineyards near the town, getting eight fine *T. cerisyi*—all males, a very dark form of *Lycaena orion*, in great plenty, *L. sebrus*, *A. adippe* var. *cleodoxa*, *S. orbifer*, one *S. sidae*, and some sundries. All this side of Slivno is very dry and stony. May 26th was again more or less cloudy, so we did not go into the

mountains, but followed up the dry, stony bed of a torrent, which in winter pours down from the Tschatalka, to the north-east of Slivno. This is probably the best side of the town for insects, the gorges running down the steep and rocky flanks of the mountain are well watered, and abound in a great variety of plants, whilst the lower hills are more fertile than the stony vineyards to the south and west. I got a good many *T. cerisyi* here, though the sun was not bright at any time in the day. Further up, in a pretty glen, I found a considerable stream, forming a waterfall; and here I saw many insects, but nothing new, excepting *Thecla ilicis* and *Chrysophanus alciphron*. Next day, May 28th, was fine, so we started up the Tschatalka. It was a long and rather wearisome way, through the dirty straggling town, up through vineyards, and then along arid rocky slopes, till we reached the steep southern spur of the mountain, all overgrown with wild lilac. Round this we wound by a very steep path, which presently led us to the undulating plateau which forms the top, and stretches away for miles northward and eastward, with many stony eminences and higher rocky points, separated from each other by nice hollows and little valleys, full of mountain flowers, and now resplendent with gorgeous crimson peonies. The sheep had not yet come so high, and the flowers were in full beauty. The peony is the abode of a rare black and yellow beetle, of which Haberhauer took at least a hundred, whilst I searched a beautiful damp meadow, watered by a clear stream, for butterflies. Fritillaries swarmed here, but none in any way remarkable; *P. mnemosyne*, *E. medusa* var. *eumenis*, and *C. leander* were plentiful, and close to the water, drinking on the damp gravel, I found the beautiful *L. anteros* in some numbers, but rather in bad order. In this meadow I also got one specimen of *C. thersamon*, which I unfortunately did not keep, as it was torn, and as I had taken it in plenty in Bosnia last year, and also near Sofia, I would not keep a bad specimen, expecting to see many more, but I never met with another during the whole time I was in Bulgaria. The day clouded over about 1.30, but I got a good many more *L. anteros* among the rocks of a dried-up watercourse, on the way down. Next day we again tried the sandstone hills west of the town, but got nothing new except *L. semiargus* var. *parnassus* (tolerably well marked) and a *Sesia*, which greatly interested Haberhauer. We went after this *Sesia* the next day to the same place, and got a good series of it, but very little else. It did not, after all, prove to be so valuable as Haberhauer had anticipated. I saw, but failed to catch, a remarkably fine *A. pandora*, in the vineyards above the town.

May 30th was cold and sunless, but the 31st was fine, and we had a good day on the lower slopes and gorges of Tschatalka, in, and just above, the highest vineyards. We took *Pieris ergane*, a good specimen of *P. chlorodice*, just out, one *A. pandora*, one *Melanargia larissa*, a very dark *M. galathea*, numbers of *M. trivia*, which appears to be common on most of the Bulgarian mountains, and three very fine large *S. sidae*. *Thais cerisyi* plentiful in the vineyards, *C. alciphron*, *L. iolas*, *Spilothyrus lavaterae*, and many other common things. I also took a fresh specimen of *Macroglossa croatica*, evidently just out. June 1st was not such a fine day, but we had some sun, returned to the same ground, and were lucky enough to get *P. chlorodyce* ♀, *L. semiargus* var. *parnassus* ♀, *A. pandora*, *S. sidae*, *M. galathea* var. *turcica*, and two *T.*

cerisyi ♀ (lower down). Next day I tried the low vineyards south-west of the town, hoping to catch a good series of *M. larissa*, but the day was unfavourable and I met with no success. I took a beautiful *Charidea treitschkii*, sitting on a stalk of grass. This beautiful insect is not uncommon at Slivno. Haberhauer rears a great many for sale, as well as *C. delphinii* and *C. victorina*, and it was a daily pleasure to see them stretching their lovely wings as they emerged from the moss in his pupa-case. June 3rd we tried the lower slopes of Tschatalka again, in hopes of getting more specimens of *P. chlorodyce*, but I only caught two, and saw two others which I failed to secure. It is a fast butterfly, and flies very like *P. callidice*, a delightful insect to catch—if you can. It is generally common in these little glens. Haberhauer tells me that he has sometimes taken as many as 100 specimens during the first week of June, but 1899 was a bad year for the locality, on account of the devastation caused by a waterspout in June, 1898, which tore up much of the hillside and destroyed the larvæ. We also entirely failed to find *S. cinarae*, which is generally to be had in the same locality, but never in any abundance. Haberhauer generally gets five or six specimens in the course of the season. June 4th was my last day at Slivno. I now rather regret that I did not stay a few days longer, as I think I might have secured a better series of *P. chlorodyce*, *M. larissa*, and *L. semiargus* var. *parnassus*. But I fully expected to find all these insects again in the Rilo Dagh and Rhodope, being quite unaware of the cold and rainy climate that prevails in these high frontier mountains of Bulgaria, where the weather rather resembles that of the Bavarian Alps than what one might expect to find in lat. 42°. I went to the vineyards south-west of the town, and took seven good specimens of *M. larissa* (all darker than those I got in Hercegovina), besides a few *T. cerisyi* ♀ and a *Sesia* or two. A long and wearisome railway journey brought me back to Sofia on June 5th, and the next day was fully occupied with arrangements for an excursion to the great monastery of the Rilo, one of the oldest and richest foundations of Bulgaria, situated about forty miles due south of Sofia, close on the Turkish frontier. It takes a good two days' journey to get there from Sofia whichever road you may take, as you have to get round or over the steepest and wildest mass of mountain in the whole country. We took a carriage and drove there in two days by Dubnica and the valley of the Struma, the road often very bad, and the hill country not particularly interesting as far as Dubnica, where we slept at a tolerable "hau," or inn. I saw no insects of any interest, except one fine specimen of *C. dispar* var. *rutilus*, which I caught in the Struma Valley. I saw several more of these, but did not stop to catch them. The drive from Dubnica down the Struma to the town of Rilo was again dull, but after turning up the valley of the Rilska (a tributary of the Struma) we came into fine scenery, and saw a good many insects, *T. cerisyi* among them. Haberhauer had formerly taken it in quantity around Dubnica, which he considers to be its probable western limit. On the road I took *L. amanda* and one *L. semiargus* var. *parnassus*, but not as well marked as those I got at Slivno. We followed the valley of the Rilska about ten miles up from its junction with the Struma before we reached the monastery, which stands about 4000 feet above the sea in a very steep and narrow valley, cut like a trench, through a mass of granite ridges, which rise in precipices to a height of 8000 feet close

above the convent. The highest point of these mountains is the Elenin Vrch; it is easily ascended in four hours from the monastery, and commands a splendid view southward and eastward over the peaks of the Rhodope and the Perim Dagh, whilst northwards the mountains fall gradually to the Bulgarian plain, and westwards to the rolling hills of Servia. These mountains are everywhere intersected by very deep valleys, which are clothed with splendid forests of beech, fir, and other trees, wherever the sides are not too precipitous to allow of their growth. Above the tree level creeping pine and juniper flourish, springs are everywhere plentiful, and the streams are strong and unfailing torrents fed by the perpetual clouds that roll up to the summits of the northern Rhodope, alike from the Black Sea, the Adriatic, and the Egean. During the whole of June and three weeks of July, which I spent in this district, I never had three fine days together; however well the weather might promise it always rained on the third day at best. On the other hand, it seldom rained all day without stopping. There were generally a few glimpses of sunshine at some time or other in each day. But 1899 was a very dry summer in the Balkans, and the harvest in the Bulgarian plain suffered seriously from the drought, so the Rhodope *might* be far wetter in a bad season.

June 9th was showery, and I did not go out till the afternoon. A beautiful meadow occupies the bottom of the Rilska valley for about two miles above the monastery, and slopes up into the woods that clothe the base of the precipices—an ideal collecting ground, but I did not do much on account of the weather. Next day was rather worse than better, and I went down the valley a couple of miles through forest, and then up a side valley, where I found good marshy meadows and caught *C. hippothoe*, just out, and *M. cinxia*, with ground colour of wings almost white in the ♀. June 11th was another bad day, very cold, and snow low down on the mountains; we had little sun. In the valley I took the following:—*P. mnemosyne*, *Leucophasia sinapis*, *A. euphrosyne* (very common), *A. pales*, *M. cinxia* (with females white ground colour), *M. phoebe*, one *L. anteros*, one *L. baton*, one *L. eumedon* var *fylgia*, *Pararge maera* (very dark), *P. hiera* (dark), one *C. leander*, one *C. pamphilus*, *E. medusa*, *Carterocephalus palaemon*, &c. June 12th was really fine, though the wind blew down very high and cold from the fresh snow. We had a tolerably good day on some broken ground about three miles up the valley where granite blocks had rolled down from the precipices on to a sheltered meadow, at the foot of the woods; these were overgrown with all kinds of flowering weeds and intersected by a tiny stream, forming a sort of natural rockwork, the best "butterfly corner" we found in Bulgaria. Bag as follows: *P. mnemosyne*, *C. edusa* (and var. *helice*, taken by Haberhauer), *C. dorilis*, *C. hippothoe*, *C. phlaeas*, *Pieris rapae* and *P. napi*, *E. cardamines*, *A. pales*, *A. dia*, *A. aglaia*, *A. euphrosyne*, *M. parthenie*, *Nemeobius lucina*, *L. anteros* (plenty), *L. icarus*, *L. hylas*, *L. bellargus*, *L. semiargus*, *L. orion*, *L. eumedon*, *E. medusa* var. *psodea*, *C. palaemon*, *S. alveus*, and *Pamphila comma*. Next day was cold and gloriously fine, of which unusual fact I took advantage to ascend the Elenin Vrch, but it was too early to get butterflies so high up, all the last part of the ascent being sprinkled with fresh snow, which spoilt the beauty of the lovely purple crocuses. But on the way down the lower slopes of the mountain I found *M. aurinia* in some numbers, also *M. cinxia*. June 14th was a

tolerable morning, and we went up the Rilska valley to "butterfly corner." We did fairly well; I took a perfectly fresh specimen of *C. myrmidone*, many *M. trivia* (very dark), the first *Papilio podalirius* of the second brood (?), and several *A. ino*, besides several good moths. The next day was too stormy to be of any good for collecting—we made the effort and got drenched.

June 16th I started for Sofia, where I was to meet Mr. Elwes, and now I rode eastwards to Samakov, on the Ister, whence I drove to Sofia next day. The pass to Samakov is a smooth grassy notch in the chain of granite mountains, about 6000 feet at the highest point, and rather boggy. About a mile south of the pass, and very little below it, a beautiful little lake lies between steep and high mountains; this must have once been the basin of a glacier, and forms one of the sources of the Rilska. The way up to the lake from the south side is very steep and beautifully wooded and on the north side of the pass another very steep and beautiful valley, the Leva Reka, leads down to the Ister. It is a long eight hours' ride, across excellent ground for insects, but it was still too early in the year for this district, and I saw nothing but *P. hiera* in the higher part of the pass. But as I came down the Leva Reka valley, at about 4500 feet, I took two fine Erebias, which I could not at first make out, but afterwards found to be *E. oeme* var. *spodea*, also *A. selene*, *A. pales*, and a good variety of *Coenonympha darus* (which has been fully described by Mr. Elwes). Then the rain came down, and I rode into Samokov wet and weary. Next day I drove to Sofia, met Mr. Elwes, and made all necessary arrangements for camping in the Rilo Dagh.

(*To be continued.*)

The Entomological Club Dinner.

Another of the successful meetings of the Entomological Club was held in the "Entomological Salon" of the Holborn Restaurant on January 16th. There was a very full meeting, and the informal nature of it appears to be much appreciated, since it gives full scope for the renewal of friendships and for chats on matters entomological, that would not otherwise be possible. The host on this occasion was Mr. G. H. Verrall, and one need hardly say that one observed a strong corner in dipterists that looked from the particular point of view of the meeting to threaten that of the lepidopterists which always comes out well ahead. Still for the time being students of all orders were keenly interested in the advance sheets (excellently illustrated by Mr. Collin) of the important work that Mr. Verrall is now bringing out on the diptera, and which possibly will do as much for the advance of the study of this order as did Stainton's *Manual* for the lepidoptera. Supper was served at 9.0 p.m., and those who have before partaken of Mr. Verrall's hospitality need no telling of the excellent way in which things were done. Some 50 entomologists sat down and among the members of the Entomological Club present were Messrs. Adkin, Hall, Porritt, South, and one hon. member, Mr. Smith. The absentees were Dr. Lowne and Dr. Mason, the latter, one regrets to say, owing to continued ill-health. Among the many other well-known entomologists who sat down to supper one observed Professors Beare, Meldola and Poulton; Messrs. Bateson, Blandford, Distant, Saunders, Tutt, Dr. T.

A. Chapman, Messrs. Gahan, Kirby, Waterhouse, Champion, Jacoby, and among the dipterists, Messrs. Adams, Bradley, Brunetti, Collin, Morley, and Vice; Messrs. Burr and Donisthorpe who had just arrived, fresh from the convivialities of Leicester; Messrs. Boyd, Edwards, Jones, Fenn, Lloyd, Rowland-Brown, Barrett, and so one might continue through the names best known in entomological circles in Britain. The Chairman in a brief speech proposed "The Entomological Club," and referred to the serious loss the body had sustained by the death of their oldest member Mr. S. Stevens (whose nephew we were pleased to see present). He pointed out, that he believed he was now the oldest member of the Club, excepting Mr. Lowne who had not attended for several years, and hoped he might long remain so (the meeting being in evident sympathy with this devout wish). He expressed his pleasure at being able to welcome them in his double-barrelled capacity of host of the Entomological Club and President of the Ent. Soc. of London, and suggested that candidates for the latter honour had better seriously consider before accepting office what the writing of a Presidential address entailed. He felt that he ought to have invited the whole of the Fellows of the Entom. Soc. of London, but its size unfortunately compelled him to draw the line somewhere. Professor Poulton afterwards proposed the health of the host, and expressed the gratification of the guests in taking part in these interesting and pleasant gatherings, and their full appreciation of the generosity that first tempted Mr. Verrall to inaugurate them in his own liberal manner. Mr. Jacoby again delighted his brother entomologists with his charming violin playing, and there can be no doubt that London and Oxford entomologists in particular are very proud of this excellent master of his art. Mr. Brunetti also gave considerable pleasure with an excellent performance on the pianoforte, but no one plucked up sufficient courage to follow out the suggestion of the host for a song or recitation, in the fashion of the good old times. Evidently entomologists have not yet quite grasped that they should treat the Entomological Salon as Mr. Verrall's smoking-room at home for the time being. At any rate no one came up to the necessary point to ensure performance. We may add that this was the fourteenth time of meeting Mr. Verrall as host at the Holborn Restaurant.

Phibalapteryx aquata a British species.

By J. W. TUTT, F.E.S.

For many years I have meant to write a short note about this insect and somehow or other have delayed doing so, but a recent talk with my friend Mr. Bower determined me to do so. Some eighteen years ago, in the days when everything was valuable, and I was eager to fill up my series, I made an exchange with a Mr. Bankhardt, I believe of Bradford, and in return for some common southern insect, *P. astrarche*, if I remember rightly, he sent me some examples of *P. vitalbata* that he had obtained from the Lake district—I believe, he said, in Cumberland, in 1882. One of these was a remarkably pale specimen with white ground colour, and I wrote and told him that I was much interested in the specimen and asked if he had sufficient to give me more. Another exchange was arranged and he sent me four pale and three normal *P. vitalbata*, the pale ones being I believe all he had.

He also informed me that he took them in the same locality, at the same time. I showed them to Mr. Tugwell and he thought so little of them that I did not trouble to give him one, but Mr. Coverdale and Mr. Bower, to whom I showed them, expressed some interest, and I accordingly gave them each a specimen. A year or two afterwards I bought Coverdale's collection before he went abroad, and so his specimen came back to me. I have the four specimens now. I wrote to several of my correspondents about these examples, and I had a variety of opinions as to what they were, and where they came from, and then for a time I thought little of the matter, and they rested in my collection. They were not particularly well set (although both the pale and typical forms were similarly set, on our white entomological pins) and I gradually replaced the typical ones with better specimens that were set in a style I approved. As collecting slowed down and I began to study more, I was one day overhauling the drawers of the Geometrids at the British Museum, when I spotted the pale *Phibalapteryx* under the name of *P. aquata*. I am not sufficiently well trained even now to see any real distinction between *aquata* and *vitalbata*, except the difference in the ground colour, the former being white, otherwise the pattern and arrangement of the markings appear identical.

Mr. Bower spent an evening with me a little while since and, in the course of our gossip, he told me that shortly before the death of Mr. S. Stevens he was going through the latter's collection, when the latter pointed out a specimen of the pale insect labelled "unique." Mr. Bower told him that he had a specimen from me and gave him some details, and states that he then removed the "unique" from the cabinet.

I have since had some correspondence with Mr. Prout about the insect, and he informs me that there were two examples sold with the "Tugwell" collection, one of which was bought by Dr. Sequeira, but that he does not know what became of the other. These must have been obtained by Tugwell subsequently to my having shown him my specimens, but the locality seems not to be known. I have no doubt there are other examples in various collections passed over, as mine were for so many years, as pale forms of *P. vitalbata*.

Mr. Prout has given me the following information of the insect: *Aquata*, Hb., "Eur. Schmett.," fig. 410, without description; the figure is good, and as the species does not vary there is no need to give a description of the figure. Rössler and Hering indicate the larva as feeding on *Anemone pulsatilla* and *A. ranunculoïdes*, but the former says that in the absence of the *Anemone* species it can easily be reared on *Clematis*. Hering gives it as occurring in Pomerania, Speyer in Waldeck, Rössler in Nassau, Bremer for eastern Siberia, Staudinger for Amurland. The distribution from Staudinger and Wocke's *Catalog*, p. 192 reads "Germany, Belgium, Holland, Lugdun., ? Piedmont, ? Sarepta, Altai."

Some new Exotic Fleas (*with plate*).

By the Hon. N. C. ROTHSCHILD, B.A., F.L.S.

Typhlopsylla tristis, sp. nov. (fig. 1).—The spine just anterior to the antennal groove, in this species, is larger than in most species of the genus *Typhlopsylla*. Immediately in front of this spine there is a series of six short bristles, followed by a series of three longer ones. There is a single long bristle between

these rows. At the posterior edge of the antennal groove there is a row of about seven *very small* bristles, and in addition to these three long and one short bristles, with two shorter bristles on a level with the upper long one. There are three bristles on the hinder edge of the head. The prothorax bears three bristles just anterior to the comb, which consists of twenty teeth. The mesonotum bears a series of rather stout bristles at its basal edge, followed by a series of five more bristles, the series curving laterally frontal. The posterior edge of the mesonotum is produced at the apex into a long and a short spine, of the same colour as the rest of the mesonotum. The episternum + epimeron of the mesothorax bears on its lower portion three long bristles, one obliquely behind the other, further up there are four more arranged in pairs. The epimeron of the mesothorax bears seven bristles, three of these are arranged in a triangle. The second, third, fourth, and fifth abdominal tergites in both sexes bear a spine on each side at their posterior edges. In the females the tergites bear two rows of bristles, in the male, however, the anterior row is absent, or represented by one or two bristles only. The seventh tergite in the female bears one long and two shorter bristles on each side, apically on its posterior edge. In the male the more ventral and basal bristle is separated from the two others. The sternites in the males bear two bristles, and occasionally a third shorter one; in the females there are four subapical bristles and a shorter one near the middle. On the seventh sternite in the female there are a few more hairs present. The tibiæ of the forelegs bear six pairs of bristles on their hinder edges, those of the middle and hind legs bear seven. Each pair of bristles is accompanied by a shorter bristle on the outer surface of the tibiæ. The femora bear ventrally one thin bristle near the joint with the tibiæ. Length 2·6mm.

I have examined four specimens of this species from *Petaurus australis*, from Victoria. The type is in the British Museum.

Typhlopsylla ingens, sp. nov. (fig. 4).—The rostrum of the head is very long, reaching to the end of the coxæ; each segment bears some long hairs at its distal end. There are the two usual rows of hairs between the mouth and the antennal groove, and in addition to these there are numerous hairs, some of them very long, at and near the lower edge of the head. In the male there are some hairs on the dorsal portion of the head, between the antennal groove and the hinder edge. The antennal groove is bordered posteriorly by thin hairs, arranged in a double row of considerable length. In addition to these there is a row of long hairs, some oblique rows of shorter hairs, and a row of very long hairs near the hinder edge of the head. The pronotum bears a comb of thirty spines. The meso- and metanotum, the epimeron + episternum of the mesothorax are all covered with hairs. The mesonotum bears two long thin spines on each side. The tergites of the abdomen bear three rows of hairs, all the sternites the second (the actual first) inclusive, are all densely clothed with hairs on the ventral surface. The femora and tibiæ are covered with hairs, the bristles at the hinder edge of the tibiæ being strongly chitinised. The bristles at the apex of the anterior tibiæ are as long as the first and second tarsal joints; those of the middle tibiæ are shorter, being about the length of the first and half the second tarsal joints, while those of the posterior tibiæ are only as long as the first tarsal joint. Length 4·2mm.

This species was found on *Bathyergus maritimus* in Cape Colony, by H. A. Spencer. The type is in the British Museum.

Pulex madagascariensis, sp. nov. (fig. 3).—The second joints of the labial palpi are twice as long as the third. There is a single large bristle before the antennal groove, and another above the mouth. A few shorter bristles are scattered irregularly over the head. Between the antennal groove and the hinder edge of the head there is a single bristle, followed by three more close together, and then four more arranged in a like manner. A row of short densely set hairs is placed along the posterior half of the antennal groove. In one specimen there is a single short spine on one side of the head only, at the anterior margin of the antennal groove. There are two strongly chitinised genal spines on each side, and also a strongly chitinised spine on each side of the anterior portion of the head, just above the maxillæ. The pronotum bears a single row of bristles and a comb of twelve teeth. The mesonotum bears one row of long bristles and many small hairs. The fused episternum and epimeron of the mesothorax bears seven bristles, two of them are longer than the others and placed just above the stigma. The episternum of the metathorax bears three bristles placed in a row, the sternum bears a single bristle also. The epimeron is much longer dorso-ventrally than it is broad, it bears two

parallel rows of bristles, and an additional bristle under the stigma. The first abdominal tergite bears two series of long hairs, the next six have a single series only. The sternite of the second segment (*i.e.*, first sternite) in the *male* bears one hair ventrally and two laterally, while in the female there is a lateral series of six hairs. The next five sternites in the male all bear two long hairs. In the female the third, fourth, fifth, and sixth sternites bear from seven to nine hairs. The seventh sternite in the female bears two long and some short hairs. The eighth sternite in the male is, as usual, enlarged, and bears many small hairs on its ventral surface, and three strong spine-like bristles at its apical margin. The ninth sternite in the female has a curved row of bristles along its hinder edge. At the posterior edge of the seventh tergite there is a long bristle with two smaller ones on each side of it in *both* sexes. The hinder coxæ bear a transverse row of short stout hairs on their outer surface. The hinder edges of the tibiæ are deeply notched. They bear on their outer surface, near the hinder edge, one row of bristles. The hind tibiæ bear five pairs of bristles inclusive of the apical pair, the third and fourth pair are close together, a single bristle is placed between the fourth and apical pair, close to the latter. The bristles of the tarsi are very stout, these are absent, however, on the ventral surface medially, except at the apex. The claws are very long, being more than half the length of the fifth tarsal joint. Length 3-3·5mm.

The type specimens found by Mr. W. D. Cowan, in Madagascar, on *Centetes ecaudatus*, is in the British Museum.

Ceratopsylla incerta, sp. nov. (figs. 2, 5, 6).—A very small and pale species, having but one comb, and that on the prothorax, consisting of 28 teeth. The portion of the head anterior to the antennal groove is relatively much shorter in the male than in the female. The labial palpi are very short, being about half the length of the head. The metathoracic epimeron bears eighteen hairs in the female and twelve in the male. All the tergites of the abdomen bear two rows of bristles; the seventh tergite bears one long bristle at its posterior edge. All the tergites are much thickened internally (see fig. 6). The tenth sternite in the male is much reduced in size. On the surface of the middle hind coxæ there are long hairs, and the second segment of the anterior tarsi is longer than the first. Length 2mm.

I have examined specimens of this insect from *Nyctinomus jugularis*, Peters, found by Mr. W. D. Cowan, in Tamatave, Madagascar, and also from *Nyctinomus brachypterus*, Peters, found by Mr. Hart, in Sierra Leone. The type is in the British Museum.

Explanation of Plate II.

1. *Typhlopsylla tristis.* Copulatory organs ♂.
2. *Ceratopsylla incerta.* Head.
3. *Pulex madagascariensis.* Copulatory organs ♂.
4. *Typhlopsylla ingens.* Copulatory organs ♂.
5. *Ceratopsylla incerta.* Copulatory organs ♂.
6. *Ceratopsylla incerta.* Abdominal tergites showing thickening of skeleton (diagram).

Plebeius argus and Plebeius aegon.

By J. W. TUTT, F.E.S.

On the morning of August 4th, 1899, I caught at Simplon specimens of undoubted *P. argus* and specimens of just as undoubted *P. aegon*. The former was abundant, the latter rare, on the flowery banks on the left side of the valley directly above the village. The difficulty of defining the differences that exist between these closely allied species is marvellous when one considers the ease with which the males, at least, can be distinguished at the first glance. In comparing the males the following superficial differences were at once noticeable. *P. aegon* was of a more distinctly violet tint (*i.e.*, had a more pronounced tinge of reddish in its tone), the costa of the forewings was more broadly white, the apex rather rounder, the outer margin also rounded, and the dark marginal border much more decided. The hindwings of *P. aegon*

had a very black upper margin (to 2nd nervure, *i.e.*, to 2nd branch of sub-costal nervure), extending to the outer margin; those of *P. argus* are only dark to the first branch. The dark margin itself is most pronounced in *P. aegon* and the fringes of all the wings are whiter (in *P. argus* the fringes appear to be quite dull grey compared with the white fringes of *P. aegon*). In *P. argus* the margin is represented rather as interneural spots. On the undersides the ground colour of *P. aegon* is bright silvery-grey with bright blue bases to all the wings; in *P. argus* the ground colour is dull grey (almost with a tinge of ochreous) and the base of the forewings is only slightly, of the hindwings more strongly, sprinkled with greenish-blue. The angulated row of spots on the underside of the forewings of P. *aegon* are larger, more conspicuously and more strongly ringed with white, whilst the direction is different, there being a much stronger angulation in *P. aegon* centrally. The discoidal spot is much nearer this row in *P. aegon*. On the hindwings again the black spots are more conspicuous, comparatively large, and more strongly ringed with white. The marginal orange spots are red-orange in *P. aegon* and yellow in *P. argus*. The metallic scales in these marginal orange (yellow) spots are much brighter and of a more brilliant blue in *P. aegon* than in *P. argus* where they are greenish. Under a hand-lens the palpi appear to be different. Those of *P. argus* have a black, pointed, terminal spine, those of *P. aegon* are rather more slender, black, with a white terminal point. The eyes of *P. aegon* are surrounded with blue-white scales, those of *P. argus* with white scales without any blue. The tips of the antennæ show a marked peculiarity, those of *P. aegon* being strongly marked with brown beneath, the long black antennal segments and white intersegmental rings also appear to be much more sharply marked in *P. aegon* than in *P. argus*. I do not wish it to be understood that these differences will hold in all individual specimens or for all the races of these insects—I have many *P. aegon* in which the marginal borders are ill-developed, and others in which the spots are comparatively small—but these certainly appear to be the marked differences in the two species where they occupy practically the same ground at Simplon.

The Hymenoptera of Suffolk*.

By F. W. C. SLADEN.

Among hymenopterists a list of the ants, wasps and bees of Kirby's county is not merely of local but of national and even world-wide interest, especially when, as in the case of the little work under consideration, it is well and carefully got up by such an able and thorough entomologist as Mr. Claude Morley, the author of "The Coleoptera of Suffolk," a book uniform with the above. Since Kirby's time various parts of the county have been well worked by many good hymenopterists, and the list that Mr. Morley has been able to present is a full one, doing great credit to the county and its collectors. The collector's name and the locality and circumstances of capture in the collector's own words are given with each species. An excellent accompaniment to this list is a good map of the county, showing at a glance the

* The Hymenoptera of Suffolk. Part I. Aculeata. By Claude Morley, F.E.S., &c. [Plymouth: J, H. Keys, 2/6.]

chief districts that have been worked over. Out of the British total of 374 species, 282 are recorded as having occurred in Suffolk. As many as 209 of these have been taken near Bury St. Edmunds, by Mr. W. H. Tuck. Mr. Perkins has also worked out a large list for the neighbourhood of Brandon and Mr. Morley himself for the district lying around Ipswich. In addition, there are fourteen species of bees taken by Kirby, which have not been met with in the county since his time (about 100 years ago). If these still exist in the county, some of them ought to turn up, and searching for them ought to give a peculiar interest and stimulant to the work of Suffolk hymenopterists. *Halictus laevis*, taken by Kirby at Nacton, in Suffolk, is still unique in the collections of the British Museum.

The long list of good Fossors testifies to the high value of Suffolk as a field for collecting these insects, especially of the barren sands in the Brandon district in the extreme north-west of the county, and of such first-class localities as Lowestoft and Southwold, and other sandy spots on the coast, where, no doubt, interesting discoveries still remain to be made. The social wasps are well represented; the hornet (*V. crabro*) is generally distributed through the county. *Odynerus* is represented by a list of ten species, the large *antilope* and the rare *gracilis* being the most important. Among the bees, Kirby's *Prosopis dilatata* is the first to call for notice. Though not recorded since Smith took it on the flowers of bramble, and bred both sexes from dock stems at Pakefield, near Lowestoft, in 1858, it is probably still lurking somewhere about the county and should be looked for. *Sphecodes rubicundus* is an interesting species, which Mr. Tuck takes near Bury St. Edmunds, in company with *Andrena labialis*. *Halictus laevigatus*, *sexnotatus* and *laevis* (previously mentioned) were all captured and named by Kirby at Barham, but unfortunately they have not been taken in Suffolk since his day. *H. prasinus* and *punctatissimus* are good insects that have occurred recently in the county. 38 Andrenas are recorded in Mr. Morley's list; Mr. Morley's ability as a collector is shown by the fact that he has captured and re-established in the Suffolk list, two of Kirby's *Andrenae*, *viz.*, *A. angustior* and *A. proxima*. The latter species, of which a female fell to his net at Great Blakenham in July, 1897, was a specially good find. Only one of Kirby's recognised *Andrenae* now remains to be found—the interesting and excessively rare *A. tridentata*. One of the best captures of recent years was a ♀ of *Nomada guttulata* taken by Mr. Morley, near Ipswich, in 1897. Previously this species had been regarded as a doubtful native of Britain, on the strength of a single specimen, from an unknown locality, in Mr. Saunders' collection. *Ceratina cyanea* has been seen in the county once since Kirby took it at Barham. *Chelostoma* (*Eriades*) *campanularum*, Kirby, continues to be widely distributed in Suffolk. Both sexes of *Megachile versicolor* have been bred from an old stump by Mr. Tuck, at Bury St. Edmunds. Nine Osmias are recorded, but one is surprised that there is no record of the capture of *O. bicolor*, *aurulenta* and *spinulosa* in the county since Kirby took them. A male of the somewhat uncommon *Psithyrus campestris* was found by Mr. Tuck in a nest of *Bombus latreillellus*; this is interesting as throwing light on the obscure associations of *P. campestris*. Among the *Bombi* the var. *distinguendus* of *B. latreillellus* is worthy of note; it seems to be widely distributed in the county.

As Mr. Morley says, Suffolk is classic ground for students of the Aculeate Hymenoptera, for no fewer than 54 out of the 158 species of bees mentioned in his list are, and will be known throughout the length and breadth of their distribution in Europe, by the names given to them by Kirby, and almost all of these were described from specimens captured by him at Barham, in Suffolk. The great joint author of the "Introduction to Entomology" did a great honour to the science of what Mr. Morley calls "Anthophilology," in selecting it as his chief study, and his reason for doing this, quoted by Mr. Morley in his preface, is interesting. It was that "in no department of the animal kingdom is the divine wisdom so eminently conspicuous," and here most collectors of the present day who have dipped into the pleasures of wild-bee hunting will be inclined to heartily agree with our much respected predecessor.

The Guests of Ants and Termites*.

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

"Wer zählt die Völker, nennt die Namen,
Die gastlich hier zusammenkamen?"

The thoughtful naturalist finds in the study of the guests of ants and termites many interesting biological problems, and the further he advances in his researches, the more fully are his pains rewarded by new and unexpected discoveries. The science which treats of Myrmecophilous and Termitophilous insects is a comparatively new one, yet one may affirm that few branches of biology have yielded such marvellous results. Ants and termites are not such inaccessible and impatient beings as they are generally represented to be, and in every zone, the nests of these social insects are found to contain guests belonging to various classes of animals, whilst the relation of these to their hosts is of various kinds. Symbiosis presents itself here under various aspects, amongst which real hospitality (Myrmekoxenie and Termitoxenie), and relations of friendship (Symphilie) take first rank, and as far as we can tell are unequalled elsewhere in the animal kingdom.

The habits of the guests of ants and termites cover such a wide field and comprise so many different elements that it is difficult to give a short yet comprehensive view of them. The work† published by me three years ago on the different kinds of Myrmecophilous and Termitophilous insects then comprised 125 of the former and 109 of the latter; these, however, form but a fraction of the individuals hidden in the nests of tropical ants and jealously guarded by their armed gaolers. New and interesting discoveries are continually coming to light in Madagascar, India, Brazil, Cape Colony, and other distant countries, and the description of new species alone occupies considerable time.

In the fullest sense, Myrmecophilous and Termitophilous animals include all the regular companions of these social insects. Chance visitors to their nests are necessarily excluded. So great is the number

* Extracts from E. Wasmann's "Die Gäste der Ameisen und Termiten," *Illus. Zeit. f. Ent.*, 1898, Heft 10-16.

† "Kritisches Verzeichniss der Myrmekophilen und Termitophilen Arthropoden," 1894.

of the latter in the nests of *Formica rufa* and *Lasius fuliginosus*, that some authorities state the number of species to be found with them at from 100 to 150. Of these the actual number of guests does not, perhaps, exceed a third.

The principal characters of true guests are found in beetles belonging to the Myrmecophilous *Staphylinidae* (pl., figs. 1-3), *Clavigeridae*, *Paussidae*, *Silphidae*, *Histeridae*, &c., to consist of peculiar yellow or reddish-yellow tufts of hair, found on different parts of the body. These prove that the beetles possessing them are licked by their hosts to obtain the pleasant secretion coming therefrom. The presence of a broad short tongue and aborted palpi suggests that those possessing these peculiarities are fed directly by the host. These adaptive characters, which both point to a genuine hospitable relationship, are often to be found in the same species. To these may be added a peculiar formation of the antennæ, which denotes a friendly relationship between guest and host, and serves to summon the ant at feeding-time by tapping it with these organs. The *Clavigeridae* (which form a sub-family distinct from the *Pselaphidae*) present an excellent example of the combination of these three characters. They are genuine guests, differing from the *Pselaphidae* in their club-shaped antennæ (consisting of fewer segments), the stunted palpi (organs strongly developed in the *Pselaphidae*), and the shape of the 1st abdominal segment, which is very large, hollow at the base, and covered with tufts of yellow hair on the concave side. The club-shaped antennæ serve as organs of communication and allow of friendly intercourse between the beetles and the ants; the formation of the mouth allows the beetle to be fed by its host, whilst the peculiar form of the 1st abdominal segment and the tufts of yellow hair are closely related with the licking of the beetles by the ants. It is, therefore, quite correct to look upon these three adaptive characters as the real characteristics of the *Clavigeridae*, and every Claviger must necessarily be an ant guest. This is borne out by the fact that, of the 100 different species of this family already described, by far the greater number have been discovered in the society of ants, and of many the actual host is known, especially of the European species and those from Madagascar and North America.

We find in certain Termitophilous *Staphylinidae* two adaptive characters, which are a proof of true intercourse, *viz.*—(1) the broad short tongue and short palpi (in the subfamily *Aleocharinae*, and only found in the true guests belonging to the *Lomechusa* group); (2) a swelling of the abdomen, in some cases quite abnormal (Physogastry) (pl., fig. 5), and not to be found among Myrmecophilous beetles. The mouth-structure leaves no doubt that these beetles are fed directly by their hosts, whilst the gigantic enlargement of the guest's abdomen is undoubtedly connected with their mode of life, for it also occurs in the Termitophilous ground beetles, *Orthogonius Shaumi*, and by their larvæ, which, when young, are thin and slender, but gradually acquire a long bottle-shaped form under the care of the termites. The yellow tufts of hair, as in those of the genuine Myrmecophilous beetles, are not present in the Termitophilous *Staphylinidae* with thickened abdomen. The tastes of termites evidently differ from those of ants. The Termitophilous beetles have not the club-shaped antennæ that facilitate intercourse between the Myrmecophilous beetles and their

hosts. On the other hand, their palpi are much swollen, and this for a time puzzled me greatly, until one day, describing the then new *Termitomorpha meinerti*, whilst painting the mouth-parts with hæmatoxylin, preparatory to a microscopical examination, I suddenly noticed on the second palpal joint a strongly developed bundle of muscle, the contraction of which occasioned a quick and strong inward and outward movement of the club-shaped third joint. The biological meaning of these massive palpi then suddenly dawned upon me, and it was evident that these serve to summon the termite at feeding-time, the palpi, and not the antennæ, being in these beetles the actual means of intercourse.

The extraordinary formation of the antennæ is, indeed, an adaptive character of the highest biological importance in many Myrmecophila, but the purpose served is not always the same. One form of antenna is similar to that of the Clavicornia and has for its purpose the furthering of hospitable intercourse. In certain Brazilian *Eciton* guests, which mimic their hosts, the antennæ are quite similarly shaped to those of the ants (pl., fig. 4) and their evident purpose is to deceive the savage host as to the true nature of its guest. In the genus *Paussus*, which are true guests, the antennæ are particularly formed for the purpose of transport by which the beetles can easily be moved from one place to another by their hosts without receiving any injury. The antennæ subserve other purposes, in some cases they serve as a means of defence against the savage attacks of the host, *e.g.*, the Myrmecophilous *Staphylinidae* (*Oxysoma* and *Xenocephalus*) and *Paussidae* (*Arthropterus*), by deceiving them as to the real nature of the owner.

(*To be continued.*)

Notes on Masonia edwardsella, a Psychid new to science.

By J. W. TUTT, F.E.S.

Masonia edwardsella, n. sp.—Imago.—The specimens (4) are (though bred) none of them in fine condition, so that this description is probably defective. Anterior wings, 11mm. in expanse, antennæ with 20 joints, the forewings rather square, and all the wings somewhat thickly, but loosely scaled. The general aspect is that of *F. casta*, but slightly broader and shorter-winged, and the colour more yellow, less brown. In the best scaled specimen there is a shading towards the hind margin that does not appear to be the result of setting, or braces, and that approaches reticulation of the "*comitella* type." The hind margins of the fore and hindwings have a border, half the width of fringe, which is darker than the rest of the wings, as is also in a less degree the fringe. This is not altogether the effect of the scaling here being more perfect. The hind tibiæ are straw-coloured (much lighter than in *F. casta*), and the tibial spur is ·68-·72, and projects beyond the tibia in a curved extremity, as is common in many *Psychinae*. The median nervure is simple, 7 and 8 stalked.

Case.—The male case is very like those of *M. crassiorella* and *M. subflavella*, the central portion 11mm. long, made of white silk, surrounded with a close cylinder of tightly packed slender pieces of plant stems, with three or four longer and coarser pieces extending 2mm.-3mm. beyond the free end of the case; these certainly are not grass stems, but woody material, the fragments apparently very old and par-

tially decayed. The empty pupal-skin protrudes beyond the case from the 4th abdominal segment, and is of a pale yellow-brown tint.

Larva.—The larva is very similar in many respects to those of the larger Psychids (*e.g.*, *P. villosella*) in colour, but differs somewhat in structure, the body is more even in thickness and the difference in size between the abdomen and thorax is not so noticeable. The head is rounded, partly retractile, prothorax has a polished corneous surface. The prothorax is of less girth, but considerably longer than the mesothorax and metathorax. The metathorax, the 1st and 2nd abdominal segments, and to a less extent the mesothorax and 3rd abdominal, are shorter (front to back) than the remaining abdominal segments, they are also slightly less in width (laterally); the 8th, 9th and 10th abdominal segments are also small. The segmental incisions are distinct; the thoracic segments not divided into subsegments; the 1st to 3rd abdominal segments are divided into two subsegments, the subdivisions of the remaining abdominal segments vague, 4, 5 and 6 appear to have at least three weak subdivisions. A well-marked ridge runs along each side, the skin much puckered (less so, however, than in the larger species—*P. villosella*); it is produced along the 3rd thoracic segment (a character rather less marked in the larva of *P. villosella*). The spiracles are distinct; on the abdominal segments they appear to be raised or slightly stalked, this is less distinct on abdominal segment 8, and not so at all on the prothorax; the spiracles on the prothorax and 8th abdominal segments are placed on the posterior portion of the segments (as in the larger *P. villosella*), whilst on the other segments they are nearly central or only slightly towards the anterior portion of the segments. The thoracic segments are chitinous like the head, and are mottled black and white (or yellowish-white), the mottlings take the form of alternate bars, which may be described as being white bars on a black ground, forming a mediodorsal, and subdorsal and two lateral bands on either side, although the white has spread so much that one might just as well call them black bars on a white ground. (I feel satisfied, however, that they originated as whitish lines on a black ground.) The tubercles are single-haired, the hairs fine, weak, simple, tapering, but comparatively long (they are longer on thoracic segments and the head than on the abdominal segments). On the abdominal segments they are placed dorsally and arranged as in the larvæ of *P. villosella*, *i.e.*, they are placed in trapezoidal form with i nearer to the median line than ii, the posteriors (ii) bear rather larger hairs; laterally, they are also as in the larger species, iii fairly strong, iv and v weak, close together, v very weak; this pair are almost directly below the spiracle, iii a little in front (of course well above); iv and v are on the lateral flange. Another tubercle vi, with hair, is placed well below the ridge, and vii is just above the base of the prolegs. The thoracic hairs appear to be placed exactly as in the larger Psychid (*P. villosella*) larvæ, except that iv and v are placed farther apart than in the larger species. The dorsal tubercles on the anterior abdominal segments are surrounded by large chitinous plates which get smaller as the segments recede towards anus, although those on the 8th, 9th and 10th are chitinous, especially the 10th which is dark. The skin of the abdominal segments is chitinous (especially 1-3) on the raised areas, independently of the tubercles. The true legs are large and strong (the third pair

are the largest), the hairs on them fairly strong and conspicuous; the prolegs weak and extending but little beyond the skin-surface; those on abdominal segments 3-6 have hooks arranged as in *P. villosella*, but on 10 the partial ring is almost circular. There is, however, no pit or depression in the centre of the ring of hooks on the prolegs, as in the larger Psychids. The six ocelli are placed rather further from the base of the antennæ, and the 6th ocellus (the last of the ventral ones) is not so far distant from the 5th as is the case in the larger species (*P. villosella*, &c.). [Bacot. Described from larvæ obtained at Aix-les-Bains, by Mr. Edwards, April, 1898].

Pupa.— ♀. The female pupal-skin is semitransparent, pale yellowish in colour, the surface smooth and shiny. It consists of a long, smooth, oval abdomen, the thorax and head being represented by a minute black collar at the anterior end, no structural details being obvious. The pupa is 6·5mm. in length, and the black collar representing the head and thorax is less than ·75mm. The abdominal segments 2-6 are larger than the others; the first is smaller, and tapers rapidly to join the minute thorax; 7-10 taper more gradually to the anus, which ends in a blunt point; the rudiments of sexual organs are clear and well-marked. The spiracles are distinct on abdominal segments 2-7, and are surrounded by a slightly raised chitinous ring. On the anterior edge of segments 4-7 dorsally is a row of small curved spines or hooks pointing backwards, these are darker than the ground colour of the pupa, and show up pretty distinctly under a 1″ power. On the posterior edge* of the 4th and 5th abdominals there is a row of small frail and almost transparent spines pointing forwards, these require some search to discover. Primitive setæ are present, but are difficult to detect owing to the reflected light from pupa-skin; they are placed dorsally in trapezoidal form (as in larva), and the inconspicuous lateral setæ appear to be in the same position as in the larva. Certain portions of the skin-surface are covered with minute spicules (Bacot, June, 1898).

This species is most closely allied to *Masonia saxicolella*, Brd., and *M. subflavella*, Mill. Indeed, we should not be surprised to find that it was the former species, which has been absolutely lost since Bruand's time, but his wing measurement for *M. saxicolella*, 15mm., is much too great for that of *M. edwardsella*, and his suggestion that his *saxicolella* might be a var. of *Bruandia comitella* (which has a cellula intrusa) adds yet another difficulty to our acceptance of this species as *saxicolella*. The specimens here described were bred from cases collected by Mr. Edwards and Dr. Chapman at Aix-les-Bains, in early April, 1898. We were under the impression that some of the cases of this species were also obtained on the rocks and walls about Antibes and Cannes, but Dr. Chapman is positive that those from which the examples were bred came from Aix-les-Bains. We have great pleasure in naming this species after Mr. Stanley Edwards, whose skill in finding, and energy in seeking, Psychid cases is most remarkable and praiseworthy.

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* In view of Dr. Chapman's remarks on these spines in *Scioptera zermattensis* (*ante*, vol. xi., p. 181), it is possible that they are really on the intersegmental membrane in this species also.—A. B.

COLEOPTERA.

Notes on the genus Meloe.

By the Rev. THEODORE WOOD, F.E.S.

As I have been fortunate enough to meet with five out of the seven British species of *Meloë*, a few notes on this genus may, perhaps, be of service to other coleopterists.

1. *M. proscarabaeus.*—This is the only species of the genus which can be considered as at all common. It is plentiful in most districts in March and April, sometimes abounding on grassy banks. I have seen it running about in the hot sunshine on the cliff-side overlooking Pegwell Bay, with an activity almost weird in a *Meloë*. The next species is the only one with which it can by any possibility be confused, and from that its even thorax and deep bluish-black colour will at once distinguish it. Its variation in size is extreme—from 12mm.-42mm. A well marked variety (var. *cyaneus*, Muls.), with purplish head and thorax, finer punctuation, and the base of the thorax almost straight, is found in the Isle of Man, and has also been taken near Birmingham by Mr. W. G. Blatch.

2. *M. violaceus*, Marsh.—Local, and seldom common. It may be recognised at once by its bright blue or violet-blue colour, and by the deep transverse impression at the base of the thorax, which looks as though it had been deen dented while soft by the thumb-nail. I have taken it at Baldock, in Hertfordshire; on the wooded slope overlooking Brothers' Water, near Ullswater; and on the high road between Inversnaid and Loch Katrine, in Scotland. Canon Fowler, in his *British Coleoptera*, gives "early spring" as its time of appearance. My own specimens, however, were taken between May 15th and July 5th, and I have even heard of its capture in August. In both this and the preceding species the antennæ of the male appear to be deformed, the sixth and seventh joints being dilated, compressed, and bent somewhat strongly inwards.

3. *M. autumnalis*, Ol.—Very rare. I have never met with the species, and know of no recent captures. Stephens gives Dartford, Exmouth, and Tavistock as localities, and Dr. Power took it at Cambridge, while Newman records it from Ramsgate. It is quite a small insect, never seeming to be larger than the smallest examples of *M. proscarabaeus*, and appears, as its name implies, in autumn.

4. *M. cicatricosus*, Leach.—A fine, sturdily built insect, with a large triangular head. The colour is black, with a slight tinge of blue; the head and thorax are coarsely punctured, with the interstices rugose, and the elytra are closely set with flat shining tubercles. It is very local, and as a rule is decidedly scarce, although Mr. Champion once met with it near Ramsgate in great profusion. I have taken about twenty specimens in all in the cuttings in the cliffs near Margate on warm sunny days in March and the early part of April. It is useless to look for it unless the sun is brightly shining. It has also been taken at Southend, Dover, and Deal.

5. *M. variegatus*, Donov.—One of our rarest and quite our most beautiful species. Its home seems to be in the Isle of Thanet, the only locality outside that district being Dover, where it has been taken by Mr. C. G. Hall. Stephens recorded it from Thanet, but it then disappeared until March 1882, when I met with three examples close

to the coastguard station at Margate. I have searched for it repeatedly since, but without success, and the locality is now practically destroyed. Canon Fowler credits me with captures at Ramsgate also, but this is an error.

6. *M. rugosus*, Marsh (= *M. rugulosus*, Brull.).—A small squat-looking species, with a very short and narrow thorax. The antennæ are unusually long and slender. I have met with it twice, the first time on the pathway by the side of the road leading from Broadstairs to St. Peters, on December 1st, 1887, the second time within five yards of the same spot at the end of April, 1895. Only a single specimen turned up on each occasion. The former date seems a curious one. Probably the insect assumes the perfect state in autumn, like *Lucanus cervus*, and the unusual warmth tempted it out before its time. It has been recorded from Southend, Prittlewell in Essex, Tavistock, and Exmouth, and Mr. F. Smith seems to have taken it on one occasion in some numbers near Margate.

7. *M. brevicollis*, Panz.—I have never seen this insect, except in Dr. Power's collection, but it seems to have been taken in several localities in the south of England. It may be at once distinguished from the preceding species by the diffuse punctuation, and also by the fact that the sides of the thorax are rounded.

Coleoptera near Southampton in 1899.—In January, 1899, *Philonthus albipes*, *P. debilis*, *P. trossulus*, *P. thermarum*, *P. cephalotes*, *P. ebeninus*, *P. fimetarius*, *P. sordidus*, *and P. discoideus* were to be found in a manure heap, while *Onthophilus striatus*, *Monotoma picipes*, *Ephistenus gyrinoides*, and *Leptacinus linearis* were abundant in the same locality. In June *Phyllobrotica 4-maculata*, *Centhorrhynchus ericae*, *Micraspis 12-punctata*, and *Cryptocephalus labiatus* turned up more or less commonly by sweeping a moor. *Scymnus capitatus* swarmed on oak trees, and *Balaninus venosus and B. turbatus* were also present. By general sweeping in July and August the following were obtained:—*Quedius cruentus* and *Q. puncticollis*, *Sibynia primita*, and *Chrysomela hyperici*. *Rhynonchus bruchoides* was common on *Polygonia* in August, and *Anthrenus varius* on *Umbelliferae* in July.—L. M. Bucknill.

ORTHOPTERA.

On the Geographical distribution of European Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

Attached to the end of *Prodromus der europaïschen Orthopteren*, Brunner gives a map of Europe, divided into districts according to the distribution of the Orthoptera found within it. Although he treats of extra-European forms, *i.e.*, North African, and Syrian, in the work, these countries are not included in the map. He divides Europe into five zones as follows:

I. Includes Scotland, Scandinavia, with Denmark, and North Russia.

II. Includes Ireland, England, the Netherlands. Prussia, Poland and central Russia, with Moscow.

III. Includes (*a*) the northern half of France, Switzerland, Bavaria and Austria, to Budapest. (*b*) Hungary, Transsylvania, Roumania as far as the river Bug. (c) South Russia, to the Ural.

IV. Includes (*a*) South of France. (*b*) Italy, from the Alps to Rome. (*c*) The Balkan peninsula between the Danube and the frontier of Greece, without Epirus.

V. Includes (*a*) the Iberian Peninsula. (*b*) Italy (south of Rome), with Sicily. (*c*) Epirus, Greece (with Crete).

Now a careful consideration leads me to think that this arrangement could advantageously be modified. I would unite zones III and IV, modifying their boundaries, and would add a further zone, including Morocco, Algeria, and Asia Minor, and in this zone the southern half of Spain would be included. My suggested arrangement therefore would stand thus:

I. The northern zone. Identical with the zone I of Brunner.

II. The north central zone. This would include Ireland and England, the Low Countries, Prussia, Saxony, Poland and central Russia, the same as Brunner's, but including the northern part of France down to Paris, and taking a further slice from south Germany.

III. The south central zone. This would be divided into provinces, as follows: (*a*) France, south of Paris, and eastwards to Budapest. (*b*) The extreme south of France, with northern Italy, as far east as Trieste. (*c*) Hungary, Transsylvania, Moldavia, and Bosnia, possibly including also Servia. (*d*) South Russia.

IV. The southern zone, divided as follows: (*a*) The Iberian Peninsula, excepting the extreme south, Andalusia. (*b*) The southern half of Italy. (*c*) Hercegovina, northern Macedonia, Bulgaria, Wallachia, and north Turkey to Constantinople. (*d*) Greece. (*e*) Northern part of Asia Minor.

V. The north African zone with: (*a*) Morocco, Algeria, and Tunis, with Andalusia, and the extreme south of Spain, including probably also Sicily, and perhaps even Sardinia. (*b*) Syria and Cyprus. (*c*) Southern part of Asia Minor.

Such an attempt can at best but be provisional, but several considerations have led me to incline to a modification of Brunner's arrangement. In the first place, the river Narenta marks a contrast between the faunas of Bosnia and Hercegovina. Bosnia is distinctly central European, while Hercegovina is as distinctly meridional. The faunas of Bosnia and south Hungary are not sufficiently distinct to warrant a separation into different zones, and Servia may have to be included with them. In spite of the Danube forming apparently a good natural frontier, the fauna of Wallachia is essentially meridional, and has strong similarity with that of Asia Minor, as shown by the occurrence of certain forms of *Sophya*, *Callimenus*. The extreme north of Spain, in spite of the Pyrenees, may be united with southern France, but the fauna of the extreme south of Spain is very distinct from that of the north; it has exceedingly well-marked affinities with that of the adjacent part of north Africa. This is shown by the distribution of the genus *Ephippigera*, which is very strongly represented in southern Spain and in Algeria. The faunas of the two northern zones are not sufficiently rich, from a point of view of the Orthoptera occurring there, to justify a subdivision into smaller provinces.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Oviposition of Dasycera sulphurella.—For the last two seasons I have noticed a colony of *Dasycera sulphurella* in some old timber lying in a yard in Chiswick. Though this insect is very common perhaps a few notes on this colony, which I am sorry to say is now destroyed, may not be without interest. I noticed the first specimen in 1898, on May 16th, lying with wings outspread, in rain water which had collected on the top of a cask. May 23rd I saw one at rest on the timber and noticed numerous holes in the wood. This species usually rests something in the manner of a Coleophorid, with the antennæ extended in the form of the letter V. On June 7th three or four moths were

flying about the timber at noon. This is the last note I have of them in 1898. In 1899 I saw the first flying over the timber at midday, May 11th, and observed specimens nearly every day up to and including June 8th. These beautiful little moths fly chiefly in the warmer part of the day, about noon, but I have seen them on the wing as early as 9.15 a.m. As I have found them quite early in the morning in water collected on the tops of casks, with Tortricids and Tineids, where there were none the previous day, I think they must have a period of flight during the dark hours. On dull days they are sluggish and apt to seek shelter, as on May 25th, when a cold east wind was blowing. I could then find none though I saw two on the 24th and two on the 26th. I observed the moths pairing on May 23rd, at 11.0 a.m., and boxed the pair with a small piece of the timber. The female did not lay any eggs till three days after when she deposited about a dozen, pushing them into the pores of the wood. On May 29th I saw another pair *in cop.*, and a third on June 1st, soon after 8.0 a.m. This last pair I observed at intervals without disturbing them. The female began to deposit her ova between noon and 1.0 p.m., walking about the timber to find suitable points. She inserted the ovipositor, which was protruded 3mm., into the cells of the wood at the end of a beam where it had been sawn across the grain, and also under the dust which lay in places on the surface of the wood. I discovered two ova immediately after she had laid them in the dust, and a third one three parts embedded at a point where she had previously been. The ova were laid singly, but those that were laid by the captured female were in clusters, no doubt owing to the small piece of wood provided. The ova appeared large for the size of the moth, somewhat cylindrical, but with the ends rounded off beautifully, though rather irregularly pitted over the surface, and of a very pale ochreous colour. In some cases, where they were thrust deeply into the wood, their shape was much modified. Six days after the ova were laid by the captured female they became deeper in tint, and hatched after another ten days—sixteen days in all. The young larvæ were very active, almost white, with a dark head, and furnished with exceptionally long stiff hairs in the lateral areas. As I was too occupied to attempt to rear the larvæ I set them free on the old timber.—A. Sich, F.E.S., Brentwood, Barrowgate Road, Chiswick.

PRACTICAL HINTS.

Field Work for February and March.

By J. W. TUTT, F.E.S.

1.—The twigs of currant bushes (cut the previous year) should be overhauled in February and March for the larvæ of *Sesia tipuliformis*.

2.—The imagines of *Hybernia marginaria* are to be found after dark sitting on the bare twigs of hedges and the bushes in woods—hazel and hawthorn appear to be preferred.

3.—A quantity of the common round oak-galls should be collected in March. They will contain the pupæ of *Coccyx splendidulana*, &c., the larvæ of many species spinning up in them.

4.—In March the imago of *Nyssia zonaria* is to be found resting on the bare sand on the sandhills of the Lancashire coasts. It emerges from the pupa about 3.0 p.m. (Birchall).

5.—Full-fed larvæ of *Myelois cribrella* may now be found in dead thistle stems. They are most partial to those of *Cnicus lanceolatus*.

6.—Larvæ of *Gelechia tricolorella* should be sought for in spun together tips of *Stellaria holostea*.

7.—Cases containing larvæ of *Narycia* (*Xysmatodoma*) *melanella* are to be found by diligently searching the lichen-covered trunks of various trees.

8.—*Brephos parthenias* flies freely in bright sunshine round the tops of birch trees, in which position it is difficult to obtain, but by standing in an open space between the trees, it is readily secured, as in passing from tree to tree it comes considerably nearer the earth.

9.—Larvæ of *Bucculatrix cristatella* are to be found on leaves of *Achillea millefolium*. Care must be taken not to shake the plants or the larvæ will fall to the ground, and then are not easily to be detected. Later on, the most beautiful white cocoons may be found spun on the leaves and stems of the food-plant.

10.—Larvæ of *Coleophora lineolea*, are now blotching leaves of *Ballota nigra* and *Stachys sylvatica*. They are also found in gardens on a species of *Stachys* commonly called "Lamb's ear."

N.B.—Similar series of "Practical Hints" for these months are to be found in the preceding volumes.

NOTES ON COLLECTING, Etc.

Butterflies of the Rhone valley.—I have been greatly interested by Mr. Wheeler's articles "Three seasons among the Swiss butterflies," for the localities he speaks of have been well known to me for the last fifteen years and more. I think that I was the first to discover *Polyommatus iolas* at Sierre (this was in 1889), and I have since given the locality to several friends. For particulars I informed Mr. Fison of it, and he afterwards told me that he had taken three specimens there. The curious part of the story is that I got three specimens too, and no more, and that, both mine and Mr. Fison's were all taken at the "famous corner," where there is, in fact, only a single bush of *Colutea*. I have several times looked elsewhere for this insect but though I could find its food-plant, I could never discover the insect itself at any other place. I am glad to find that it does, as I felt sure it must, occur, elsewhere. Mr. Wheeler is quite right about the best part of the Pfynwald for butterflies, but as regards *Apatura ilia* I have always found it most abundant alongside that long row of poplars just on the Sierre side of Pfyn. I once in July found *Cyaniris argiolus* in some abundance on bushes in a meadow near Pfyn, on the Leuk side, and I have generally found a few *Lycaena arion* between the Rhone Bridge and Pfyn. I never could find *Cupido sebrus* at all, I am sorry to say. I once got a fine lot of *Argynnis daphne* and of *Chrysophanus gordius* on the zigzags going up to the Martigny bourg. Mr. Fison was kind enough to tell me of this locality for *C. gordius*, but the specimens taken there cannot be compared either for size or colour, with those found on the Italian side of the Simplon. If Mr. Wheeler should visit the Rhone valley again, I recommend him to go to Zermatt and try the Riffel Alp about mid-July. He will find amongst other things *Melitaea* var. *merope* and *M. cynthia* abundant. *Colias palaeno*

is, too, very abundant at the end of June, near the Belalp hotel. *Parnassius delius* also abounds on the Hospenthal side of the Furka pass, a short distance beyond the summit. I have, however, taken it above the bridge, just below the hotel at Bérisal.—R. B. Postans, Eastbourne.

Lepidoptera at Wicken in 1899.—I was at Wicken during the first week of August, 1899, but the weather was bad for night-work—light, cold, and windy. I met with nothing much except the ordinary Wicken species. *Thymelicus lineola* was very common on Burwell Fen, *Tapinostola hellmanni* common and in good condition, *Arsilonche alborenosa* occurred sparingly both as imagines and larvæ (about one-third grown); *Helotropha fibrosa* was just coming out, as also was *Calamia phragmitidis*. The larvæ of *Cidaria sagittata* were found sparingly on the seedheads of *Thalictrum flavum*. *Tortrix dumetana* was abundant and just out; *Stigmonota orobana* was fairly common, but worn, as also was *Phoxopteryx paludana*. Among other species were *P. siculana*, *Eupoecilia rupicola*, *E. notulana*, *Orthotaenia antiquana*, *Ditula semifasciana*, *Catoptria expallidana*, *Tortrix costana*, and *Sericoris fuligana*. *Leioptilus microdactylus* was common, too, at dusk. *Macrogaster arundinis* had been comparatively common, but not a specimen of *Hydrilla palustris* was taken.—J. A. Butterfield, B.Sc., 35, Wrottesley Road, Plumstead S.E.

Lepidoptera in the Frensham district, 1899.—I collected and noted the following insects, dating from March to July 30th, 1899.—*Pieris napi*, *P. rapae*, *Euchloë cardamines*, from May 8th to June 2nd, very late in putting in an appearance. *Cyaniris argiolus* (second brood), July 25th. *Pieris brassicae*, May 28th (abundant). *Gonepteryx rhamni* (plentiful throughout the season; second brood July 19th, though numerous scarcely any ♀s noted). *Nisoniades tages*, May 28th. *Callophrys rubi* June 2nd, very scarce. *Chrysophanus phlaeas* (second brood), July 25th. *Polyommatus icarus* (abundant). *Coenonympha pamphilus*, *Syrichthus malvae*, June 5th. *Pamphila sylvanus*, *Pyrameis cardui*, June 8th (poor condition). *Pararge megaera* (scarce), *Pyrameis atalanta* (hybernated), June 17th. *Epinephele ianira*, June 17th. *Brenthis euphrosyne*, June 21st. *Thymelicus linea* (very common), July 7th. *Limenitis sibylla*, *Dryas paphia*, *Argynnis adippe*, *Enodia hyperanthus*, July 10th. *E. tithonus*, July 17th. *Satyrus semele*, July 20th. *Pararge egeria* appeared to be totally absent this year. *Choerocampa elpenor*, June 12th, flying at dusk at rhododendrons and honeysuckle (common). *Macroglossa stellatarum*, June 3rd. *M. fuciformis*, (broad-bordered), May 28th (common). *Zeuzera aesculi*, *Hepialus hectus*, *Anthrocera trifolii* (common), *Calligenia miniata*, *Lithosia mesomella*, *L. complana*, *Euchelia jacobaeae* (swarming), *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, *Porthesia auriflua*, found hybernating larvæ spun up (very small) in web under bark and in crevices on trunks of trees. *Dasychira pudibunda*, *Orgyia antiqua*, *Malacosoma neustria*, *Cosmotriche potatoria*, *Urapteryx sambucata*, *Rumia crataegata*, *Venilia maculata*, *Metrocampa margaritaria*, *Ellopia fasciaria*, *Eurymene dolabraria*, *Selenia illunaria*, *Odontopera bidentata*, *Crocallis elinguaria*, *Amphidasys betularia*, *Hemerophila abruptaria*, *Boarmia repandata*, *Tephrosia crepuscularia*, *T. punctulata*, *Pseudoterpna cytisaria*, *Iodis vernaria*, *I. lactearia*, *Hemithea thymiaria*, *Zonosoma punctaria*, *Asthena luteata*, *Eupisteria heparata*, *Acidalia scutulata*, *A. interjectaria*, *A. aversata*,

A. immutata, A. emarginata, A. remutata, A. imitaria, Cabera pusaria, Bapta temerata, Macaria liturata, Panagra petraria, Fidonia atomaria, F. piniaria, Aspilates strigillaria, Abraxas grossulariata, Lygdia adustata, Lomaspilis marginata, Pachycnemia hippocastanaria, Hybernia leucophaearia, H. progemmaria, Anisopteryx aescularia, Larentia didymata, L. multistrigata, L. pectinitaria, Emmelesia affinitata, E. decolorata, Lobophora hexapterata, Thera obeliscata, T. firmata, Hypsipetes impluviata, Melanthia rubiginata, M. ocellata, M. albicillata, Melanippe tristata, M. unangulata, M. rivata, M. montanata, M. fluctuata, Anticlea rubidata, Coremia munitata, C. propugnata, C. unidentata, C. quadrifasciata, Camptogramma bilineata, Eucosmia undulata, Cidaria var. *centum-notata, C. ribesiaria, C. testata, C. fulvata, C. pyraliata, C. dotata, Eubolia mensuraria, Anaitis plagiata, Platypteryx lacertula, P. falcula, P. hamula, Cilix spinula, Dicranura vinula, Pygaera bucephala, Gonophora derasa, Bryophila perla, Triaena psi, Pharetra rumicis, Leucania comma, L. pallens, Hydroecia nictitans, Xylophasia rurea, X. lithoxylea, X. polyodon, Dipterygia pinastri* (very common), *Heliophobus popularis, Mamestra persicariae, Apamea oculea, Miana strigilis, Grammesia trilinea, Caradrina morpheus, C. taraxaci, C. cubicularis, Rusina tenebrosa; Agrotis puta,* a freshly emerged specimen picked up on the grass, May 30th; *Agrotis tritici, Lycophotia porphyrea, Triphaena orbona, T. pronuba, Graphiphora augur, Noctua plecta, N. c-nigrum, N. rubi, Trachea piniperda, Taeniocampa instabilis, T. stabilis, T. munda, Scopelosoma satellitia, Cosmia trapezina, Dianthoecia cucubali, Phlogophora meticulosa, Euplexia lucipara, Hadena dentina, H. pisi, H. thalassina, Cucullia verbasci* (larvæ), *Anarta myrtilli* (and larvæ), *Hydrelia unca, Plusia chrysitis, Abrostola urticae, Plusia gamma, Gonoptera libatrix, Amphipyra pyramidea, A. tragapogonis, Euclidia mi, E. glyphica.*—C. Bingham Newland, Llanstephan, Carmarthen. *October 22nd*, 1899.

Autumnal collecting of Lepidoptera.—From the end of August, 1899, I found collecting unsatisfactory except for larvæ of *Coleophora fuscocuprella*, of which Mr. Studd and I secured, between us, some 34 examples on October 19th, three of which occurred on birch, a most unusual food-plant for the species.—B. A. Bower, F.E.S., Langley, Eltham Road, Lee, S.E.

Collecting Lepidoptera at Malvern in 1899.—Last August was spent with my family at Malvern. I was disappointed as far as entomology was concerned. On July 30th we saw *Enodia hyperanthus, Polyommatus astrarche,* besides numbers of commoner things. On July 31st I took a fresh *Depressaria arenella*. August 1st, in a wood on a hill side we found several *Leucophasia sinapis*, mostly a little worn, flying and settling on herbage. This must have been about 6.20 p.m. On August 8th my hopes of meeting with *Polygonia c-album* were fulfilled, but the specimen was too worn to take. As it was the first British example I had seen at large I watched it for some twenty minutes. No others were seen. The next day I noticed a strange butterfly flying straight towards me down a lane near the British Camp. When captured it proved to be *Thecla w-album*. There were several fine elms in the lane. The same day I took a few of the common but beautiful little *Argyresthia goedartella* by beating birches. On August 10th, at Ledbury, a fine *Catocala nupta* (?) was resting high up on a beam of the curious old market hall. Though we tried with the aid of small stones to persuade it to show its lower wings it steadily

refused. A visit to Knightsford Bridge the next day gave us a fine *Gonepteryx rhamni*; we only saw one other during our stay. On August 12th *Anaitis plagiata* occurred in a wood, and on the 16th, while passing a large ash tree, I saw what I thought was a curious thickening of the petiole of one of the leaves. A second later the cause of this appearance was revealed. The swellings on the petiole were the prolegs of a fine larva of *Sphinx ligustri*, which was otherwise hidden by the leaflets. It was of a greyer green than the usual specimens one finds on privet. *Polyommatus icarus*, *Pararge megaera*, and *Epinephele tithonus* were abundant in the district, *Satyrus semele* locally so, *Aglais urticae* not numerous, *Vanessa io* so scarce that only one was seen. *Pyrameis cardui* was not seen at all, while *P. atalanta* was everywhere, from the plains to the summit of the Worcestershire Beacon. It was a fine sight to see them flashing up or down the hill sides. *Macroglossa stellatarum* on fine days was well in evidence. On dull days I saw them sitting on the rocks on three or four occasions, but it required a quick hand to box them.—Alfred Sich, F.E.S., 65, Barrowgate Road, Chiswick. *November 30th*, 1899.

Larva of Aciptilia pentadactyla.—On June 23rd last I was turning up leaves of *Tussilago farfara* in the hope of finding larvæ of *Platyptilia gonodactyla*, in a place here where that species occurs. On the underside of one leaf I did find a plume larva just spun up, and concluded that I had got the desired Pterophorid. It disappointed me, however, by producing on July 7th the much more abundant *Aciptilia pentadactyla*. The larva had doubtless wandered from some neighbouring convolvulus.—Ibid.

Pyrameis atalanta in January.—The 9th of January was very warm and sunny, and I saw a beautiful specimen of *P. atalanta* flying around and settling upon a haystack in my orchard. It seems unusually early for the insect to leave its winter quarters.—J. Mason, Clevedon Court Lodge, Somerset.

Vanessids in Somerset.—It was remarkable that I did not see a single specimen of *Vanessa io* last year (1899); *Pyrameis atalanta* was plentiful, but the specimens small; *P. cardui* occurred sparingly, and *Aglais urticae* was less abundant than usual.—Ibid.

Acherontia atropos and Sphinx convolvuli in Somerset.—Last autumn, pupæ of *Acherontia atropos* were fairly common, and an autumnal imago with crippled wings was brought me. A few *Sphinx convolvuli* were taken in the neighbourhood, although I saw none.—Ibid.

Macroglossa stellatarum attracted by colour.—*Macroglossa stellatarum* was the insect of the season last year. It was not uncommon to see three or four specimens at one time at one geranium plant. I had some orchids in bloom during the time the insect was out, the flowers (rosy-purple in colour) within a foot or eighteen inches from the glass of the roof, and it was no uncommon thing to see the moths flying backwards and forwards outside just over the flowers, evidently attracted by the colour, as it was impossible for any scent to escape, in fact, the particular species in bloom has no scent.—Ibid.

Pararge egeria, etc., in Bucks.—After reading the note (*ante*, p. 25) I thought it might be interesting to mention the capture of two specimens of *Pararge egeria* in a beech wood lying between Penn and High Wycombe, Bucks. After spending three hours there,

with rather poor results, I found, on coming out of the wood, this species in a clearing near the edge, and also netted four specimens of *Syrichthus malvae* there. I was much struck with the fact of *Coenonympha pamphilus*, being extremely local in this neighbourhood. I spent from June 12th-24th at Penn, and yet with the exception of the clearing already mentioned, where I saw at the most half a dozen examples, I only saw the species in two other places, one at a village called Haslemere, the other between Chesham and Amersham, in both of which localities for about fifty yards they were very abundant, and yet there was none to be seen a little further on. I may add that on September 17th last I found a larva of *Sphinx ligustri* feeding on ash. It went to earth the next day.—A. M. Swain, 5, Kelvin Terrace, Sydenham. *January 22nd*, 1900.

Sphinx convolvuli at Penarth.—A schoolboy brought me a full-grown larva of *S. convolvuli*, September 1st last. I have captured three of these beautiful moths at Penarth.—T. L. Howe, Beaufort House, Penarth.

Acherontia atropos at Penarth.—Two fine pupæ of *Acherontia atropos* were brought me by the stationmaster, who obtained them when digging potatoes on September 12th last. I put them in my breeding-cages and four days afterwards I found that one had emerged, the second following two days later.—Ibid.

Winter specimens of Gonoptera libatrix.—Having noticed in your issue of January 15th, 1900, an account from one of your correspondents of the winter capture of *Gonoptera libatrix*, I thought it might be of interest to mention that these insects are of very frequent occurrence in this house during the winter months. On December 29th a fine ♀ appeared in the drawing-room at about 5.45 p.m., and after wandering aimlessly about for a short while, finally settled on a lady's dress. We came across one or more specimens on an average every three or four days; and, as they are always in perfect condition, I conclude that this species emerges late, and hybernates in dwellings or outhouses.—H. W. Shepheard-Walwyn, Bidborough, Tunbridge Wells.

Entomological Pins.—I was interested in reading the Rev. G. H. Raynor's note on the above subject (*Ent. Rec.*, xi., p. 345), as I am not at all satisfied with our present position. I must confess that in my use of No. 10, wherever practicable, I am, in Mr. Raynor's eyes, one of the sinners, and, sad to say, an unrepentant sinner. Only this last summer I set a long series of *Eupithecia linariata*, thereon, and if I had sent any of them to Mr. Raynor I should have good ground to fear that his allusion to "the greatest error of all" was aimed at me. But if black pins be used, I really cannot see the clumsy effect of No. 10, which satisfies me perfectly. To use a more slender pin would be all very well if time were no object to the entomologist; but I protest that it takes nearly twice as long to move in safety a series of insects, on No. 18 than a series on No. 10, and, to my mind, the bending of a pin is one of the most serious calamities that can befall a collector. I have every intention of setting my next year's *E. linariata* (if they emerge) on the same pin. In short, I follow the advice of our good old friend, Dr. Knaggs, even more literally, perhaps, than he intended, and pin almost everything with No. 8 or No. 10. Of course, like Mr. Raynor, I am referring to Tayler's pins; they are so excellent that the marvel

to me is that there are any others on the market at all.—Louis B. Prout, 246, Richmond Road, N.E. *December 28th*, 1899.

CURRENT NOTES.

The eighth Annual Exhibition of the North London Natural History Society, was held on December 30th, 1899, and January 1st, 1900, and proved a very successful gathering. The members and visitors who were present on the later date, but especially the entomologists, were much interested and instructed by a lecture on Mimicry and Protective Resemblance in Insects, with numerous lantern illustrations, which was delivered by Mr. J. W. Tutt, F.E.S. Exhibits in the entomological department were perhaps not quite so numerous as on some previous occasions, but included some good drawers of British lepidoptera, by Mr. L. B. Prout and others, some well illustrated life-histories, by Messrs. J. A. Simes and A. Quail, and a good show of exotic lepidoptera, among which Mr. Bacot's cases of insects from the Transvaal were specially interesting.

The presidential address read before the Entomological Society of London, on January 17th, by Mr. G. H. Verrall, dealt with a large number of highly interesting, if debatable, points bearing on such subjects as "unscientific work," "priority," "synonymy," "means and sufficiency of publication," &c.

We learn that our esteemed friend, Mr. S. J. Capper, F.L.S., F.E.S., having long since passed his presidential majority, has again been re-elected President of the Lancashire and Cheshire entomological society.

The Annual Meeting of the South London Natural History and Entomological Society was held on January 26th, when a very satisfactory report was read. The only regrettable feature was the Treasurer's statement that the Council had been unable from want of sufficient funds to publish its *Proceedings* in two half yearly instalments as had been done the preceding year, although they would now be published in one volume, with all possible speed. There is a humorous side to a picture that shows the entomologists at Chandos Street investing £1000, because they have more money than they require for current expenses and publication purposes, whilst those of Hibernia Chambers have the material and have to wait until the end of the financial year before being able to afford the money to publish it.

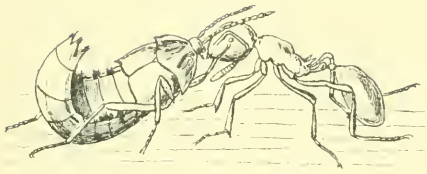
The balance-sheet of the treasurer of the Entomological Society of London shows a balance of £181 6s. 8d. for the past year. How this flourishing condition of affairs has been brought about is evident from the Presidential address, where we learn that in 1899, there were 300 members and £400 invested, whilst in 1899, there were 418 members and nearly £1000 invested. In 1866, the President tells us there were only 207 members, so that whilst there was only a permanent increase of 93 members in the 23 years, 1866-1889, there has been an increase of 118 members in the 10 years, 1889-1899. During the past year, however, we learn from the Secretary's report that there has been a considerable falling off in the number of Fellows elected, and side by side with this a marked falling off in the number and quality of the exhibitions at the ordinary meetings. This latter is strikingly

exhibited in the length of the *Proceedings* for the year, which has only reached 35 pages against 47 for 1898, 65 for 1897, and 61 for 1896. The *Transactions*, too, are smaller for 1899, and one notes them as containing only 499 pp. and 17 plates, as against 592 pp. and 17 plates for 1889, whilst those for 1898 also contained but 444 pages and 19 plates against 606 pages and 17 plates for 1888. The *Proceedings* are especially interesting to the general body of Fellows and should be maintained at any cost at the highest possible standard of excellence.

It must be a matter for general congratulation among naturalists that Sir John Lubbock has been raised to the peerage as Lord Avebury. In the bustle and worry of a crowded life, no one has done more to raise the level of the popular taste in those branches of natural science he so dearly loves, and one could wish that increased leisure would allow the Ex-President of the Entomological Society of London again to return to the more special branches of our own science, in which, for so many years, he was one of the most successful and hardest workers. We also observe that he presided on January 10th-11th at the Conference of Science Teachers which was held at the Imperial Institute, and we may further note that at the same conference Mr. J. W. Tutt read a paper entitled "Object Lessons in Natural History." It would appear that natural science will soon have its lawful place in the curricula of our technical and secondary schools recognised by those in authority (H.D.).

There is an excellent annotated "List of the Macro-Lepidoptera collected within eight miles of Hull," by Mr. J. W. Boult, in the *Transactions of the Hull Scientific and Field Naturalists' Club*, published December 1st, 1899. In it 287 species are recorded, but the list is more remarkable for the omission of some of what we generally consider common species than anything included. One is inclined to consider that the excuse for the exclusion of the Micro-Lepidoptera, *viz.*: "We experience great difficulty in getting these named," is altogether unworthy of a Field Naturalists' Club whose duty it should certainly be to name the insects of its district for the outsider. We further observe that the Editor "has taken a good deal of trouble with Mr. Boult's list, the order and nomenclature of which have been reduced to that of Mr. G. T. Porritt's *List of Yorkshire Lepidoptera*, 1883." One expects Natural History Societies to mark progress, not to set back (as we suspect this really means) the nomenclature used by its more advanced and up-to-date members to a list (Doubleday's) that has long since been obsolete among the newer generation of lepidopterists; all of which, however, detracts nothing from the value of the list, as a local list, which shows evidence of great care and knowledge of the local fauna on the part of the author who compiled it from his own observations and those of his co-workers.

Our "Special Index" for vol. xi. (1899), consisting of no less than 28 pp. of closely printed (double-column) references, can now be obtained from Mr. H. E. Page, "Bertrose," Gellatly Road, St. Catherine's Park, S.E. Price 1s. Our last volume completed, therefore, consisted of 352 pp. of letterpress, 8 pp. general index, 28 pp. special index, and 2 pp. title page. We suspect 390 pp. solid 8vo., constitutes a record in the quantity of matter published by any one monthly entomological magazine in this country in a year.



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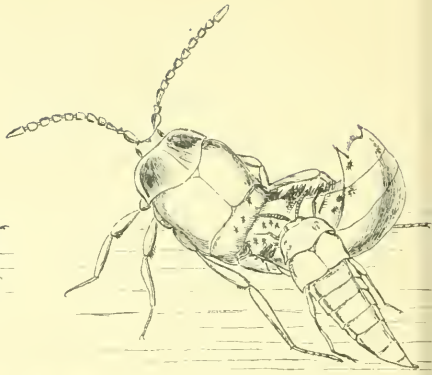

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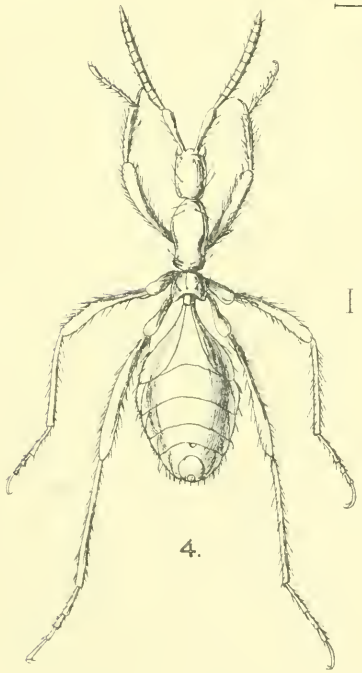

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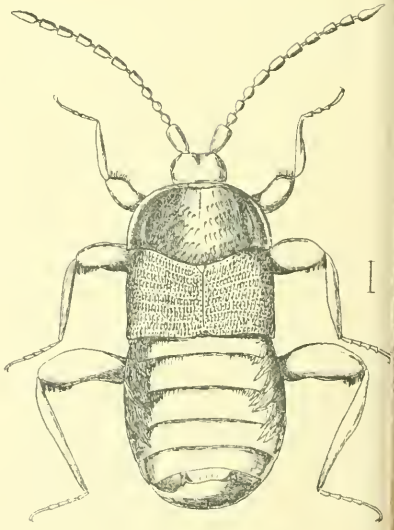

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The guests of Ants and Termites.

The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XII. No. 3. March 15th, 1900.

Digne Revisited.

By H. ROWLAND BROWN, M.A., F.E.S.

Digne has been much exploited of late years, and several articles have appeared in this and other entomological magazines*, dealing with its butterflies. However, as my wanderings led me there at the least frequented season of the year, some additional remarks may not be altogether out of place. One always, I find, leaves London either too late or too early for most of the summer insects, unless the holidays fall in July—the golden month for the collector. Last year "the waiting time" was even longer than usual, for wherever I went there was the same story of a backward season and delayed emergence. Indeed, my first week in the famous capital of the Basses-Alpes was unexpectedly disappointing. With recollections of the year before at Hyères and in the Swiss Alps, where the profusion of insect life is never failing, the scant array of full boxes at the end of long hours in the sun was at first rather discouraging. But Digne is a place which grows upon you, and it had for me, at any rate, this charm—the most potent of all—that it was quite unlike any other locality at home or abroad I had ever visited. When I arrived on June 3rd the spring broods were all going over, and the cold snap which affected even the Mediterranean littoral in the early days of April had obviously not left the Basses-Alpes untouched. Even the cherries, which grow, wild and cultivated, in normal seasons, so plentifully that the pigs are fed with them, had suffered, and one proprietor, whose tree I happened to fancy, objected on the ground that last year he had not enough for his animals, let alone for the foreigner. However, I may say here that wherever I went in the neighbourhood I always found the natives charmingly polite and hospitable. No one ever dreamed of interfering with my rambles, which led me through much enclosed land, vineyard and hayfield, and above all it was delightful to be in a place where the butterfly-net was a recognised and respected object of interest in the landscape. On the border it was different, but that (as Mr. Kipling says) is another story to be told elsewhere.

The first impressions of the mountains about Digne is that they offer prospects of illimitable hunting. Experience soon taught me that in June, at any rate, the higher altitudes are unproductive, while

* "Ent. Rec.," ix., p. 221. "Ent. Mo. Mag.," xxviii., p. 270; xxvii., p. 281; xxx., p. 175. "Entom.," xxiii., p. 79.

the same may be said of the lower slopes where the box and the broom are conspicuously thick. Low hills with patches of oak scrub, and the river and torrent beds, on the other hand, provided improved sport, and it was in the latter that I encountered the best specimens as well as the best species. A little stream winding up through a shady ravine at the back of the railway station, the Valley of the Vipers, on the left bank of the Bléone, and a brooklet almost immediately opposite coming from the mountains, proved the three most productive localities of the kind, nor must I omit to mention the hills that skirt the Torrent des Eaux-Chaudes, and best of all the lateral valley which ascends to the right beyond the Etablissement Thermal. These, with La Collette, the slopes behind the old Romanesque church of Notre-Dame, and the lower levels on the road to Les Dourbes, constitute so far as I can discover the likeliest spots, though I came across nothing but a few dissipated *Plebeius aegon* and *Melitaea athalia* in the famous Bois du Rocher Coupé on the road to St. Auban.

In a land where no one travels unless he be a *commis-voyageur* it is hardly to be expected that the train service should be rapid and comfortable. Once south of Grenoble the speed is not excessive, and opportunities for enjoying the scenery of the local stations many. Digne, as the crow flies, cannot be much more than seventy miles from Grenoble, where the night train from Paris arrives at about nine in the morning. But it is half-past three before the journey is over (123 miles by rail), and the omnibus from the "Boyer-Mistre," cleanest and most comfortable of French provincial hotels, jogs leisurely up the plane-shaded boulevard, which during various hours of the day serves the double purpose of *Champs-de-Mars* and promenade. Yes! this is Digne, the goal of my entomological ambition for the time being. I have Donzel's guide to the local Rhopalocera to work by, and the notices collated by Mr. A. H. Jones, Mr. W. E. Nicholson, Mrs. Nicholl, Mr. Tutt, Dr. Chapman, and others to stimulate the pleasures of anticipation, and there is Miss Fountaine in the hotel to add the experiences of a week's previous collecting. Donzel's list is sufficiently comprehensive. As far as the butterflies are concerned I do not find that any substantial additions have been made since the French naturalist paid his first visit here in the earlier part of the century. Land has come into cultivation, the forest area has probably decreased, but Digne itself has not altered much, nor the character of its mountains and meadows. Climbing the stony side of La Collette the first time from the Dourbes road the net is soon busily employed with the beautifully fresh Theclids everywhere in evidence. A new insect always marks the entomological calendar with the proverbial white stone. To-day it is *Thecla spini* and *T. ilicis*, with its splendid var. *cerri* to remind us that we are in south-east France. *Papilio podalirius* is sweeping the higher knolls, raising expectations of that more delicate *Papilio* with whose appearance the long journey from England has not been altogether unconnected. *P. machaon* is not far off, and presently we find the clump of wild thyme at the forest edge alive with *Chrysophanus alciphron* var. *gordius*, the males common enough in all the splendour and sheen of coppery lilac, the females less frequent, and in some cases "throwing back" more to the type with which we are familiar in the higher Alps. Then it is not long before a belated *Leucophasia duponcheli* arrives on the scene, though the first brood of this species is obviously on

the wane, and among the aromatic herbs *Melitaea athalia*, presently to be the commonest of all the fritillaries, is already sipping sweet honey. The sun at Digne during my visit generally shone in a blue sky until between 2.0 and 3.0 o'clock in the afternoon ; after that it would be hazy until 6.0 or 7.0, when the sky cleared again. But I hardly ever found much on the wing after midday, and as I did my setting invariably before breakfast I took no opportunity to test the hour at which the first flight commences. But at Hyères in the summer months, as I have elsewhere pointed out, you cannot go wrong any time between 5.0 a.m. and 11.0 a.m., after which—siesta for man, beast, and insect. It is now close on noon. *Polyommatus bellargus*, a large and brilliant form, is everywhere, the commonest blue. An occasional *Pieris daplidice* var. *bellidice* hovers upon the hillside, but with the exception of the thyme and the *Dorycnium*, earlier loved of *Nomiades melanops*, there is not much in the way of flowering plants to attract the passing butterfly. I found here, as everywhere else on the hills, that all insects pass up what I may perhaps best describe as "gullies of light," rarely leaving their chosen track, and that for capture, instead of scouring the scarps of burning rock, it is advisable to wait at the top of one of these "shoots." That dark butterfly almost tumbling up the slope is *Erebia evias*, a fine local species, but, like the rest of the spring things, *Thais medesicaste* included, well-nigh exhausted—which reminds me that I did see var. *honoratii*, but it had been bred by one of the local dealers out of pupæ innumerable, and he wanted thirty francs for his rarity, for which sum he did not find a purchaser that day, at any rate.

(*To be concluded.*)

Notes on the Fumeids, with descriptions of new species and varieties.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Separating from our traditional Fumeas, *Bacotia sepium* as allied more nearly to the Micro-Psychids, and *Proutia betulina* and *P. salicolella* as having fundamentally different antennæ, we leave to the Fumeids a group of species that may be defined as Macro-Psychids, *i.e.*, Psychids with the anal hooks of the ♂ pupa ventral and of the ♀ absent, the ♂ imago without the subcostal accessory cell and with the antennal pectinations scaled, and the ♀ araneiform.

The anterior tibial spur may be used broadly to distinguish the Micro-Psychids and Epichnopterygids from the true Psychids, the former having it short and the latter long. At the position of our Fumeas, as one of the lowest groups of true Psychids, the anterior tibial spur is in a plastic condition, as it is also, to a less extent in the genus *Bijugis*, as a lower branch of the Epichnopterygids. The facts suggest that as the Macro-Psychids developed from the Micro-Psychids, possibly in association with the acquisition of plumed antennæ, a lengthening of the tibial spur, useful as an antennal comb, took place, or tended to do so. This we see in *Bijugis* and *Fumea*. The effort was a failure on the Epichnopterygid side, and was given up. Hence *Epichnopteryx* has short spurs, Psychids have long ones. It would seem, however, that no spur was equal to the required functions (whatever they are), and the spur is lost equally in higher Epichnopterygids and Psychids. In *Fumea* we are provided, then, with the anterior

tibial spur as an organ varying a good deal in different species, and so affording a specific character, whilst in the family of *Psychidae* it affords a subfamily character.

The Fumeid species may be divided into two groups :

1. With short spurs (under ·64 of tibia); median accessory cell; reticulate wing markings (usually).

Of these I have verified *reticulatella* and *comitella*, and presume from descriptions that *raiblensis*, *rouasti*, and *norvegica* belong to this group.

2. With spurs over ·64 in length; with median nervure simple; without any suggestion of wing reticulations.

a. Species with spurs of length ·65-·75: (1) *Crassiorella*. (2) *Affinis*. (3) *Mitfordella*, n. sp. (4) *Hibernicella*, n. sp. (5) *Subflavella*. (6) *Edwardsella*.

β. Species with spurs of length ·77-·81: (7) *Casta* with vars. *nitidella*, *intermediella*, *bowerella*. (8) *Scotica*.

γ. Spurs ·85: (9) *Germanica*, n. sp.

All these Fumeas clothe their larval cases with straw-like material placed lengthwise on the cases, and it is supposed that the nature and size of this material affords specific characters of value. In the first place, I think the material is more rarely straws of grass stems than is generally believed, and many of the cases that look most white and straw-like and are at once taken to be covered with grass stems are really clothed with dead stalks and pedicels of various flowering plants. Some cases that apparently belong to the same species as straw-covered ones are encased in leaves of fir, whilst the size of the case and of the materials covering it depend much more on the sex of the specimen and on the materials available than on anything else.

I doubt very much whether the larvæ will present any characters of use to separate the most allied species; even the most separated species have larvæ so alike that it is difficult, if not impossible, to define them by absolute description, and for the present, at any rate, I have no material adequate to make any such attempt.

The want of fully correlated material is perhaps to some extent the reason I have to make much the same confession as to specific characters in the ♀s. The only definite distinction I know of is between *Masonia crassiorella* ♀ and *Fumea casta* ♀, the former having reduced tarsal joints, the latter the full five to each tarsus.

The neuration gives a very definite division between the short-spurred and long-spurred sections of the genus, the former possessing the median accessory cell, in the latter the median nervure is simple. This distinction is at least valid in the species I have examined.

I hoped to find some useful characters in the antennæ and have not been altogether disappointed, but have been obliged to conclude that there is considerable variation in the antennæ within the limits of a species. Whether *M. crassiorella* with 21 antennal joints is or is not the same species as one with 24, may seem to be properly decided in the latter sense, but when we find *M. crassiorella* having 22 and 23 joints to the antennæ amongst specimens that it is impossible to doubt are all the same species, it is difficult on this ground to distinguish those with 21 or 24 as distinct. The same considerations apply strongly to the forms of *F. casta*. That the antennæ are variable within the species is confirmed by an examination of the antennal structure. The antenna consists of a large basal joint, the second joint is also large and globular, normally the third is the first of the clavola or flagellum

and carries two very short pectinations, which are longer on the 4th and reach full length on the 5th or 7th, dwindling again gradually to the penultimate joint, where they are short, the last joint being simple. In several instances, apparently of individual and not of specific variation, however, there is intercalated between the 2nd and 3rd joints as above described, a joint that is very short and disc-like, without pectinations; in others three and four as above described are fused together into one long joint with four pectinate processes. Similarly, at the extremity of the antennæ, the last simple joint may be of various lengths or may be wanting, the then last joint being pectinated, or sometimes it might be more correct to say that the last normally simple joint possessed pectinations.

The examination of the antennæ is unfortunately handicapped by two circumstances. In the first place the antennæ are very apt to be damaged by mould, mites, *Psoci*, or other destructive agencies to a degree much beyond anything in most lepidopterous insects. In the second, they can only be confidently described when removed from the specimen and mounted in balsam or otherwise, and this is quite inadmissible in regard to many specimens, in fact, in regard to any not one's own property, unless by special permission. Yet, without this, one cannot certainly count the number of joints, as the first pectination varies a good deal in length and in the extent to which it is visible beyond the thick scaling of the basal joints and of the face. As a rule, I think, descriptions stating the number of antennal joints mean what they profess, *viz.*, actually all the antennal joints, and may or may not be accurate owing to the difficulties I have mentioned, but may be taken as being to a high degree of probability within one of the truth. In other cases, however, I think descriptions merely cite the number of visible joints, that is, of pectinated joints visible in a good specimen. This is the case, for example, unless I am much mistaken, in the distinction drawn by Hofmann (*Berliner Ent. Ztschft.*, iv., p. 32) between the antennæ of *nitidella* and *affinis*, where he gives the former sixteen joints and the latter 21, when truly they have eighteen and 23 (or more properly 24).

I have carefully measured the length of the antennal joints and of the pectinations in a number of specimens. The uniformity of these throughout the genus is quite beyond what I expected. There are one or two anomalies that may be of some definite meaning. The great mass of specimens have pectinations of a length between ·49 and ·51 of a mm., and the length of a joint varies from ·183 to ·210. The exceptions in the pectinations are an *affinis*, which has them ·56mm., and an *intermediella*, preserved in balsam four years ago and probably placed under the cover glass shortly after emergence and subjected to pressure. This may account for the otherwise anomalous figure of ·67—the joints in this specimen are also long, ·216; or it may be that these are the correct measurements and that those taken from dry specimens are in error owing to contraction. However this may be, it remains that fifteen antennæ, belonging to *M. crassiorella*, *M. subflavella*, *M. edwardsella*, *M. affinis*, *F. intermediella*, *F. casta*, *F. germanica*, and *F. bowerella*, have pectinations, of which the largest do not vary beyond from ·49mm. to ·53mm. in length, a difference well within errors of measurement. The length of the antennal joints is less uniform. Four *M. crassiorella* vary from ·164mm. to ·195mm.

M. affinis, *M. subflavella*, and *F. casta* vary from ·200mm. to ·203mm. (except one *F. casta* ·210mm.), *F. intermediella* ·216mm.-·227mm., *F. boreella* ·240mm., *F. germanica* ·182mm.-·194mm. The numbers are no doubt too small to found any strong conclusions upon. In some degree these differences may be of value as specific characters, as, for instance, in the case of *F. boreella*; but even in this instance we find the rule holds that pectinations are of uniform length throughout the genus, but that the length of antennal joints varies directly with the size of the insect and inversely as the number of joints.

Great reliance has been placed for distinguishing species on the form, size, and colour of the wings. Perhaps I unduly depreciate these, my first impressions having been formed by attempting to verify some distinct characters of this sort between the *F. roboricolella*, *F. nitidella*, *F. intermediella*, and *M. crassiorella* of our British collections, working all the time as I now believe entirely within the limits of one species. Apart from this, however, these characters are not very valuable. As to colour, with the exception of the reticulate species, and perchance of *M. subflavella* and *M. edwardsella* (*saxicolella*?), all the species can be very black when fresh, but vary a good deal, and all become a snuffy brown with age (especially if assisted by a little damp). The form of the wing varies within the limits of a species to some extent, and is very difficult to define as between different species. In our English series unquestionably the apparent form of the wing is much more dominated by various styles of setting than by any inherent character. All the species have a certain amount of natural curvature of the wings and of pleating or folding at the nervures, and the extent to which these are straightened out by pressure and flat setting, or exaggerated or altered by drooping or bad setting, much outweighs any actual difference of form in the appearance of the insects.

(*To be continued.*)

British Dragonflies*.

By MALCOLM BURR, F.Z.S., F.E.S.

It is with a real pleasure that we welcome Mr. Lucas' handsome work on the dragonflies of Great Britain (and we observe the Channel Islands are included), for, apart from the interest that the book evokes by its own merit, it supplies a badly felt want in the literature of the zoology of the British Islands. Hitherto the collector of dragonflies has had to be satisfied with Harcourt-Bath's brief account, unless he were able to consult the various periodicals dealing with the subject in various languages, or McLachlan's purely scientific work. It is this lack of a complete popular account of our Odonata that has doubtless frightened many a beginner from the study of so interesting a group.

In the introduction, the author cites the latest census, quoting W. F. Kirby's work of 1890, which enumerates 1800 species of known recent Odonata, and suggests that, by future investigation, four times this number might be discovered. Of these 1800 species, 39 are British. There are further seven reputed species, always an irritating

*"British Dragonflies (Odonata)." By W. J. Lucas, B.A., F.E.S. [Upcott Gill, 1900, 8vo., pp. 1-356. With 27 coloured plates, and 57 figures in the text. Price 31s. 6d.]

appendix to a faunistic work. The second chapter is devoted to the life-history, illustrated by several interesting figures, showing various forms of dragonfly ova, and the curious method of copulation. Then follows an account of the classification of the heterogeneous groups included under the name Neuroptera; and the author follows Brauer, Packard and others, in elevating Odonata to ordinal rank. He divides them into two groups or "superfamilies," the *Anisopterides*, including the *Libellulidae* and *Aeschnidae*, and the *Zygopterides*, containing the *Agriomidae*. In two important chapters the author describes in detail the nymph and the imago and offers tentative dichotomic tables for the determination of the British forms; this part is fully illustrated and the numerous figures of structural detail will be of great value to the student. Then comes an account of the genera and species in detail, and the information under each heading is classified to enable the reader to find without difficulty any point which he may be seeking. Under *Sympetrum flaveolum*, Linn., for instance, we find—Synonymy, Linné's original description, size, male imago, female imago, immature colouring, variation, early stages, oviposition, egg, data, habits, migration, and distribution within the British Isles. We notice, however, that no account is given of the foreign distribution; this would greatly add to the understanding of the relations of the various species *inter se* with regard to the European fauna. The author, after apparent hesitation, regards *Sympetrum striolatum*, Charp., and *S. vulgatum*, Linn., as distinct, the latter not being regarded as British.

We congratulate the author upon his adherence to the strict rule of priority; he does not shirk from changing familiar names, *e.g.*, *Anax imperator*, Leach, for *A. formosus*, Lind.; *Aeschna caerulea*, Ström., for *A. borealis*, Zett.; *A. isosceles*, Müll., for *A. rufescens*, Lind.; *Lestes dryas*, W. F. Kirby, for *L. nympha*, Selys; *Pyrrhosoma nymphula*, Sulz., for *P. minium*, Harr., though he does not follow W. F. Kirby in adopting *Coenagrion* for *Agrion*.

The special part is followed by a chapter on breeding the nymph, full of interest, in which the author gives us the result of his experience, as also in the practical chapter dealing with the preparation of dragonflies for the cabinet, a task which has deterred several students from attempting to make collections, owing to the unsatisfactory condition into which specimens usually deteriorate.

The plates are excellent, as indeed would be expected, for Mr. Lucas is his own artist, and his talent in illustrating entomological subjects has long been familiar to all. We might suggest that in the figure of *Ischnura elegans* (Plate xxiv), the abdominal blue annulus is scarcely distinct enough. When this insect is feebly flying to and fro among the reeds that fringe the small ponds which it loves to haunt, it is the bright blue ring which shows up the insect before it can be properly distinguished among the dark shaded rushes; "and in such situations, unless sought for," Mr. Lucas remarks himself, "it is not easily detected, its coloration being not conspicuous;" the unfortunate blue ring, however, often betrays its whereabouts.

The work is well printed on good paper, the binding is a little too dark for khaki, and it is the excellence of the "get up" which has doubtless raised the price, a thing which we all deplore.

Mr. Lucas is to be congratulated on the production of so complete

and useful a work, one to which we have long looked forward, and which fills a very serious gap in British entomological literature.

Bulgarian Butterflies.

By MARY DE LA B. NICHOLL, F.E.S.

(*Concluded from* p. 34.)

We did not make a start till June 21st, but as it rained during the greater part of every day, we did not lose our time, and when we reached Samakov we had much to do in getting ponies and men to accompany us into the mountains. It was afternoon before we left Samakov, and we only got about three hours' ride out of the town before dusk, when we encamped at the opening of the fine gorge of the Leva Reka, some seven or eight miles south of the town. Next morning was bright but too windy for collecting, as we rode up the valley. We encamped again about five miles higher up, as the weather looked very threatening, and we were caught by a thunderstorm before we could pitch the tents. We stayed here the whole of the next day, hoping for fine weather—it improved a little, and we went up a side valley to collect, but did not get many insects for lack of sunshine. Our bag consisted of one good *Erebia epiphron*, three *E. oeme* (var.), one *A. selene*, several *A. pales* and *C. darus* (var.). June 25th was a tolerable morning, so we started, intending to cross into the Rilska valley and there encamp at the butterfly corner, three miles above the monastery. But storms set in almost immediately, and we could catch scarcely anything. In a lucky gleam of sunshine, I got a specimen of *C. dorilis*, and on the way down the Rilska, took some nice *A. pales* approaching var. *gracca*, and saw one *Colias myrmidone*. We arrived at the monastery drenched, were most hospitably received, and were glad to find a dry sleeping-place, in such wild weather.

June 26th was really fine, we went up to our "butterfly corner" and took 52 species of butterflies before 3 p.m., when it came on wet. I append list, of which the most remarkable items were the very large and dark specimens of *M. trivia* ♀, and of *M. cinxia* ♀, a *C. virgaureae* almost without white on the underside of the hindwings, and a large dark var. of *M. athalia*. The list is thus: *P. mnemosyne*, *C. edusa*, *C. myrmidone*, *A. crataegi*, *P. napi*, *P. rapae*, *E. cardamines*, *L. sinapis*, *T. rubi*, *C. virgaureae*, *C. hippothoe*, *C. alciphron*, *C. phlaeas*, *C. dorilis*, *L. orion*, *L. astrarche*, *L. eroides*, *L. icarus*, *L. rumedon*, *L. escheri*, *L. bellargus*, *L. argiolus*, *L. semiargus*, *L. cyllarus*, *L. alcon*, *L. arion*, *N. lucina*, *L. populi*, *V. egea*, *V. atalanta*, *V. c-album*, *V. urticae*, *M. cinxia*, *M. trivia*, *M. didyma*, *M. athalia*, *A. euphrosyne*, *A. daphne*, *A. aglaia*, *A. niobe* var. *eris*, *E. medusa*, *P. maera*, *C. leander*, *C. pamphilus*, *S. alveae*, *S. carthami*, *S. malvae*, *N. tages*, *H. thaumas*, *H. sylvanus*, *C. palaemon*.

June 27th was a grey and showery day. We went up the the valley of the Ilina Reka, and made the most of a few transient gleams of sunshine, but did not get much, *L. amanda*, *M. phoebe*, and *C. hippothoe* were plentiful in the meadow along the stream, and we saw *Limenitis populi*, but could not catch it. June 28th brought us still worse weather, cold, grey, and showery, too bad for collecting. So we explored the mountains, riding to one of the sources of the Rilska, a wild little lake, at the head of the Corovica in very fine scenery. Here we got a gleam of sun, and I took our first specimens of *Erebia lappona*,

then, climbing the ridge by a steep and difficult sheep track, we crossed the pass into the Ilina Reka in a blinding snowstorm. We found ourselves at the extreme head of the valley close to the Turkish frontier, and soon got down into warmer regions, the valley appeared to be excellent collecting ground, and I much regretted that we never were able to revisit the spot in better weather. We had at least five hours' ride mostly through splendid forest and lovely scenery, but over almost the worst road I ever traversed, before we reached our quarters. We considered that we never could get the pack horses with the tents up to the head of the Ilina Reka.

June 29th was fine, so we devoted the day to "butterfly corner" up the Rilska, and to some good ground which we had observed higher up the valley. We took *P. rapae* var. *mannii* (not very well marked), *L. eroides*, *L. aleon*, and several fine dark specimens of *M. triria* ♀. Higher up, we took one *E. epiphron* in bad order, several *E. oeme*, many *A. pales*, *E. medusa*, *M. aurinia* and *C. darus* (var.), and saw several *C. myrmidone*, which we failed to catch. Next day, June 30th, was again fine, and we went into camp in a pretty little valley just over the northern slope of the pass to Samakov, a lovely wild place, about 6500ft. high, well sheltered by rocky mountains, with a clear stream handy. Here we remained for four days, of which three were fine, quite the best weather we ever had during our whole sojourn in the Rhodope. We collected and explored all around and found a good many nice insects, although never in any great numbers anywhere—a fact which was everywhere remarkable. We got a good number of species, but never found swarms of anything. This may probably be accounted for by the extraordinary climate of the Rhodope, which produces a remarkable growth of ferns and mosses, but does not favour the Rhopalocera. The butterflies most plentiful in the higher mountains were *M. cynthia*, which we took nearly everywhere above 7000ft., flying over rough grass or juniper bushes, and *E. lappona*, also very common at that elevation. About the same height we got a few—a very few—specimens of *S. cacaliae*, and *E. epiphron*, but both of these were scarce. Lower down, *E. oeme*, *C. darus* (var.) and *A. pales* were common, a few *C. myrmidone* haunted the steep slopes (where they were very hard to catch), and *P. rapae*, inclining to var. *mannii*. *L. semiargus* was literally the only "blue," and *C. dorilis* (very scarce) the sole representative of the "coppers." *Vanessa urticae* was tolerably common, and there were a few specimens of *C. edusa* to be seen, flying wildly across the notch of the pass. Near the lake, *E. eurgale* occurred, just out of chrysalis, and I took one specimen of *A. paphia*, also crossing the Pass on a high wind. Later on, we should probably have taken *E. tyndarus* on this ground—we met with it in some abundance at our next camp on the Leva Reka—where we moved on the 5th of July. This was 2000ft. lower down, and we stayed here two nights getting tolerable weather, but not finding any very remarkable insects—*L. arion*, very bright and blue, appeared commonly, *A. euphrosyne* swarmed in the brushwood, and we took *M. dictynna*, *S. serratulae* and several *C. myrmidone*. July 6th was again fine, and we resolved to break camp and return to Samakov, whence we should be able to work the mountains further to the eastwards by striking the valley of the Marica where it comes out from the higher ground into the foothills of the northern slopes of Musalla—the highest point of

the Rhodope (and probably of the Balkan peninsula). The difficulties of travelling in these valleys are much increased by their extraordinary steepness, they usually run north and south, like deep trenches cut in the granite, separated by high and very precipitous ridges, quite impracticable for baggage animals, so that to pass from one valley to another it is necessary to descend to the foothills, or to cross the pass at the head of the valley into Turkish territory, which we could not do, because we had failed to get permission to travel in Macedonia. Could we have worked the southern slopes, we might probably have found better weather, and a greater variety of insects. Before leaving camp on July 6th we hunted the mountain slopes immediately above us, and took *E. tyndarus* in some numbers, it was almost exactly similar to the specimens taken by me last year on the Bosnian mountains, nearly approaching to var. *ottomana*, very large and bright, and the under side of the hindwings much tinged with reddish-brown. Riding down the valley we got nothing new till we reached the mouth of the gorge, where we had formerly encamped, and here we found a good many butterflies. *P. apollo*, just out, *C. hyale*, *C. myrmidone* (type and var. *alba*), *E. ligea*, quite fresh, *M. trivia*, *A. hecate* ♀ (rather worn), *L. eumedon*, *L. arion*, *C. iphis*, *C. arcania*, and many other common things. We reached Samakov rather late, and found that old Haberhauer had broken his shin, and wanted to go home and nurse it—which was rather inconvenient, as it left us with only one man (the cook) who could speak German and interpret for us. However, we fortunately found a young Bulgarian, a pupil of the Anglo-American Mission at Samakov, who not only spoke English well, but had a taste for natural history, and collected insects in a somewhat primitive fashion. We engaged him as interpreter, and spent all the next day (which was stormy) getting horses, guide, &c., at Samakov. At night we drove up to a little, bran-new, summer lodging establishment, about seven miles from the town, prettily situated in the forest that clothes the southern slopes of Musalla.

July 8th was grey and stormy, and we could do no collecting till the afternoon, when we went out along some open ridges in the surrounding woods, and found very good ground, and some variety in butterflies, our best take being *L. croides*, in excellent order. *E. ligea* was just out, also *L. aegon*, *E. hyperanthus*, *A. dia*, *M. galathea* (rather dark), *M. aurelia*, &c. July 9th was another stormy day, so we did not go into camp, but pottered around Camkurje which is a very good place for collecting, but the weather was too bad for us to do it justice. *E. ligea* and *E. euryale* were common, and we took *S. sidae* and many common fritillaries, in gleams of sunshine. On the 10th the weather looked better, so we started for the Marica valley, which we reached after a long and lovely ride across the mountains, descending by a steeply terraced track to our camping-place—we had great difficulty in finding any open place large enough, and flat enough, for our tents. We saw no remarkable butterflies all this day; and never passed any inhabited dwelling. Our horses were stampeded about midnight, probably by a bear, but they could not go far in the thick forest and no damage was done. Next day broke fine and clear, and we proceeded up the valley, which continued for miles, deep, narrow, thickly wooded, and totally uninhabited. We passed several sawmills, but they were deserted as the harvest was going on. It looked like excellent ground

for insects but we saw nothing but swarms of *A. euphrosyne*, a good many *E. ligea* and *E. eurydle*, and occasionally a very dark specimen of *P. maera* (I may here remark that I am extremely puzzled to define *P. maera* and *P. hiera*, which I have taken in such variety that I often cannot be certain which is which). At last we reached the frontier gendarmerie post—a little wooden house, beautifully situated just below the tree level; then we ascended very steeply by a track very much like steep, old-fashioned, attic stairs, winding up and up, till we reached a beautiful open basin, surrounded by rocky mountains, overgrown with creeping pine and juniper. This basin was decidedly moist, if not actually boggy, and very good ground, but of course the clouds began to roll up and the mists to gather. Still we did our best, and got a good many *A. pales*, some fine red specimens of *E. oeme*; *E. epiphron* (very much tinged with red) some ♀ specimens having a definite pale patch running from the band of the forewings parallel to the costa, and shading into the dark ground colour about the middle of the wing. Then I was fortunate enough to take an *Erebia* which greatly puzzled both Mr. Elwes and me, and we almost hoped that it might prove to be a new species. It is, however, stated to be only a local variety (*rhodopensis*) of *E. gorgone*, with which species the genitalia, as examined by Dr. Staudinger and Mr. Edwards, correspond exactly.

I append a description of this butterfly, of which we managed to secure six specimens, all males, between July 11th and July 18th. The females were not, probably, then out, and should be looked for a week later. All our specimens were taken in the highest part of the Marica valley, and in the Airandere, which is a valley running parallel to it on the east, at an elevation of 6000ft. or more. Its flight does not resemble that of *gorge*, it is a more sluggish insect, and squarer in the wings; nor does it haunt rocks as *gorgone* does—we took all our specimens amongst the juniper bushes that clothe the stony slopes, near streams or boggy hollows.

Expanse 1·50in. Wings dark brown, with broad, sharply defined, rusty band, crossed by rays on forewings and hindwings, and a very faint rusty patch adjoining the costa of forewing. Two apical eyes, large, white-pupilled, and conspicuous; one of my specimens has a third, very minute one. There is also a small eye placed rather below the middle of the rusty band of forewing. In the band of the hindwing are several small white-pupilled eyes. Underside forewing entirely rust colour, with the band of the upperside repeated distinctly in a fainter shade. Eyes as above. Underside hindwings dark rusty brown, with two distinctly marked paler bands mottled with grey. Eyes of upper side repeated.

July 12th was very grey, and rain threatened, but we resolved to stay where we were in hopes of more Erebias, and after getting well drenched, Mr. Elwes succeeded in catching one quite fresh, but alas! a cripple. July 13th the weather was even worse, so we moved on, and crossing the pass at the head of the Marica by a very rough path, (where one of our baggage ponies tumbled down), got into Turkish territory, and rode for about four miles along high mountain pastures, with occasional snowbeds still lingering in the hollows, to the head of the Airandere. Here we recrossed into Bulgaria, and descending another very steep track we got down into another narrow granite valley parallel to that of the Marica, and exactly like it. It all looked good collecting ground, but the day was hopeless, it poured steadily, and we pitched our very damp tents by the frontier gendarmerie post, about three hours' ride down the valley, and above the tree level. Next

day, the 14th, the weather promised a little better, and the sun shone as we started up to the higher level of the valley to search for the *Erebia*. But it clouded over at 8 a.m. and heavy storms set in for about three hours. At last there was a gleam of sunshine, and I got one *Erebia*, of the new variety, and several nice *E. epiphron*, *E. oeme*, and *E. eurvale*. Then the rain began again, and we resolved to go down the valley to the lower hills, in hopes of getting our tents dry, and also our clothes, for everything was saturated. We passed much good ground on our way down to Kostenec, a village with a small bath establishment; about four hours' ride down from the gendarmerie hut. Here we found sunshine, and a dry camping ground in a beautiful country, and remained for two days, making excursions around Kostenec and into the hills (about 3000ft. high) to the east of the baths. We took *P. apollo*, *C. myrmidone* and var. *alba* (in some numbers), *L. meleager*, much worn; *L. arion* (and a fine ab. of *arion*, almost unmarked), *L. eroides*, male and female, *L. alcon*, *L. anteros* (worn), *A. daphne*, *A. ino*, *A. pandora*, *Neptis lucilla*, *Apatura iris*, *Limenitis populi*, *L. sibylla*, *L. camilla*, *M. galathea*, a var. of *M. didyma*, with pale ground colour of the forewing; *T. ilicis*, *E. aethiops*, *E. ligea*, *S. serratulae*, and many common insects. On the 17th, the weather looked better, and we rode up the valley again in hopes of getting a good series of the *Erebia*. But again the rain came down in torrents, and again we pitched in the wet! The morning of the 18th was fine, and at 8 a.m., we were on our ground. No sooner had we arrived there—than thunderstorms gathered all round us, and for three weary hours we sheltered amongst the boulders. Then came a gleam of sun, and Mr. Elwes had the luck to get three of the coveted butterfly—I never saw any. Then it rained all the rest of the day and we got into camp drenched. July 19th was worse than ever, so we determined to return to civilization and get dry, hoping to revisit the Airandere later on, to secure some more Erebias in better weather, but our letters necessitated an early return home, so, instead of encamping again in the Rhodope, we drove across the Balkan, by the low pass of Ginec, 4500ft., to Lom-Palanka, on the Danube. It is an easy two days' journey, and we collected as opportunity served as we drove along. The mountains were principally limestone, with rocky and rather barren slopes to the southwards, and fine rolling pastures on the higher levels, a broad and fertile range of hills rather than mountains, with fine forests on the northern slopes. We took several interesting butterflies, especially *L. admetus* and var. *rippertii*, *L. zephyrus* (a diminutive second brood), *L. argus*, *N. lucina* (a second brood, just out), *Thecla quercus*, *T. acaciae* (much worn), *Satyrus phaedra*, *Epinephele lycaon*, swarms of *Apatura ilia* var. *clytie*, in the flats near Sofia, and many sundries, not deserving especial notice. This was the last day of our tour, and I will conclude this lengthy paper with a correct list of captures from May 21st to July 20th—

Papilio podalirius, *P. machaon*, *Parnassius apollo*, *P. mnemosyne*, *Thais cerisyi*, *Aporia crataegi*, *Pieris brassicae*, *P. rapae*, *P. napi*, *P. ergane*, *P. chloridice*, *Anthocaris belia* var. *ausonia*, *Euchloë cardamines*, *Leucophasia sinapis*, *Colias edusa* var. *helice*, *C. hyale*, *C. myrmidone* (and var. *alba*), *Gonepteryx rhamni*, *Thecla ilicis*, *T. acaciae*, *T. rubi*, *T. quercus*, *Chrysophanus virgaureae*, *C. hippothoe*, *C. dispar* var. *rutilus*, *C. thersamon*, *C. alciphron*, *C. dorilis*, *C. phlaeas*, *Lycaena argiades*, *L.*

aegon, *L. argus*, *L. zephyrus*, *L. orion*, *L. baton*, *L. astrarche*, *L. anteros*, *L. eroides* (considered by Mr. Elwes to be a distinct species). We took a good many specimens of both sexes, in various parts of the Rhodope, but never saw any *eros*—nor had Haberhauer ever taken it in the Balkans), *L. amandus*, *L. escheri*, *L. bellargus*, *L. meleager*, *L. admetus*, *L. cumedon* (and var. *fylgia*), *L. sebrus*, *L. semiargus* (and var. *parnassus*), *L. minimus*, *L. cyllarus*, *L. iolas*, *L. arion*, *L. alcon*, *Nemeobius lucina*, *Limenitis populi*, *L. sibylla*, *L. camilla*, *Apatura iris*, *A. ilia* var. *clytie*, *Neptis lucilla*, *Vanessa cgea*, *V. c-album*, *V. polychloros*, *V. urticae*, *V. io*, *V. atalanta*, *V. cardui*, *Melitaea cynthia*, *M. aurinia*, *M. cinxia*, *M. phoebe*, *M. trivia* (and var. *nana*), *M. athalia*, *M. aurelia*, *M. dictynna*, *Argynnis selene*, *A. paphia*, *A. pandora*, *A. aglaia*, *A. adippe* (and var. *cleodoxa*), *A. niobe* var. *eris*, *A. lathonia*, *A. euphrosyne*, *A. hecate*, *A. pales* (and var. *graeca*), *A. dia*, *A. ino*, *A. daphne*, *Melanargia galathea*, *M. larissa*, *Erebia epiphron*, *E. oeme*, *E. medusa* (and var. *eumenis*), *E. lappona*, *E. tyndarus* var. *balcanica*, *E. gorgone* var. *rhodopensis*, *E. aethiops*, *E. ligea*, *E. euryale*, *Satyrus phaedra*, *Pararge maera*, *P. hiera*, *P. egeria*, *P. megaera*, *Enodia hyperanthus*, *Epinephele lycaon*, *E. ianira*, *E. tithonus*, *Coenonympha leander*, *C. iphis*, *C. arcania*, *C. darus* (interesting var.), *C. pamphilus*, *Spilothyrus alceae*, *S. lavaterae*, *Syrichthus sidae*, *S. carthami*, *S. alceus*, *S. serratulae*, *S. cacaliae*, *S. malvae*, *S. orbifer*, *S. sao*, *Nisoniades tages*, *Carterocephalus palaemon*.

We should certainly have added considerably to this list had we been able to remain in Bulgaria for three weeks longer.

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

The normal habit of butterflies is to fly by day, yet everyone who follows our current literature is aware that examples are occasionally captured by night, usually attracted by light. Thus Studd notes having captured *Pyrameis atalanta*, September 19th, 1893, and September 23rd, 1897, *P. cardui*, August 1st, 1894, *Zephyrus quercus*, August 26th, 1897, and *Polyommatus astrarche*, July 21st, 1899, in his light-trap at Oxton, whilst Harker observes that *Aglais urticae* flew into a room about 10 p.m. July 6th, 1895, at Harrow. Scudder states (*Psyche*, vol. viii., p. 396) on the authority of a boy of Topeka, Kansas, that, in the autumn of 1898, *Anosia archippus* was observed almost every night, and, on one occasion, the lad had taken *Amblyscirtes vialis* flying around a light. These and similar facts, therefore, open up the question as to whether butterflies can, and do, migrate by night, and lend considerable interest to the following, for which Scudder is primarily responsible.

This author relates that, when spending a summer on the island of Nantucket, the under-keeper of the powerful flash-light at Sankaby Head, brought him a box full of "moths," which had been fluttering about his lantern in great swarms the previous night. On opening it, he discovered about a dozen living specimens, not of a moth, but of *Eugonia j-album*, an insect closely resembling our British *E. polychloros*. Hundreds of these had flown into the lantern and given the keeper considerable trouble. That they were moving from one place to another at the time would appear certain because the butterfly had never before, nor has it ever since, been found upon the island of Nantucket. A similar occurrence is quoted by Scudder on the authority

of a light-house keeper on Lake Ontario, who, in 1885, reported that he had been greatly annoyed by the large swarms of *Anosia archippus*, that flew against the lantern and obscured the light.

But migrations of butterflies, so far as we know, do not usually take place by night. They are children of the sun, their movements are readily observed, and their migrations have been recorded by many naturalists. In his *Voyage round the world*, Darwin writes: "Several times when the ship has been some miles off the mouth of the river Plata, and, at other times, when off the shores of northern Patagonia, we have been surrounded by insects. One evening, when we were about ten miles from the Bay of San Blas, vast numbers of butterflies, in bands or flocks of countless myriads, extended as far as the eye could range. Even by the aid of a telescope it was not possible to see a space free from butterflies. The seamen cried out that it was 'snowing' butterflies, and such, in fact, was the appearance. More species than one were present, but the main part belonged to a kind [*Colias lesbia*] very similar to, but not identical with, the common English *Colias edusa*. Some moths and Hymenoptera accompanied the butterflies, and a fine beetle (*Calosoma*) flew on board. Other instances are known of this beetle having been caught far out at sea, and this is the more remarkable, as the great number of the *Carabidae* seldom or never take wing. The day had been fine and calm, and the one previous to it equally so with light and variable airs. Hence we cannot suppose that the insects were blown off the land, but we must conclude that they voluntarily took to flight. The great bands of the *Colias* seem at first to afford an instance like those on record of the migrations of another butterfly, *Vanessa* (*Pyrameis*) *cardui*: but the presence of other insects makes the case distinct and even less intelligible. Before sunset, a strong breeze sprung up from the north, and this must have caused tens of thousands of the butterflies and other insects to have perished."

Colias edusa, which is indirectly referred to in the preceding paragraph, is one of the best-known of our British immigrant species. Equally uncertain and sporadic, also, is the appearance of its relative, *C. hyale*, in Britain. Sometimes, for many years together, neither species of these butterflies will be seen. Then will come a year, when, in May or early June, one or both of the species makes its appearance in large numbers. From the north of England (sometimes even from the north of Scotland) to the south, it is then to be met with, wherever a clover or lucerne field is to be found, although, as might be expected, the southern counties get the more frequent visits and the greater number of visitors. Occasionally the two kinds will appear in the same year. They did so in 1835, 1857, 1868, 1875, 1876, and 1892, when both insects were in great abundance. On a few other occasions, during the century, when one species has been abundant, the other has also occurred, but more sparingly, although, usually, their seasons of abundance occur in different years. Fitch gives (*Entom.*, xi., pp. 53-54) the following summary of the years in which the two species of *Colias* have been abundant in this country: *C. hyale* was common in 1821, 1826, 1828, 1835, 1842 (particularly so, but no *C. edusa* seen), 1843 (many, also *C. edusa*), 1844 (several, *C. edusa* much the commoner, as in 1843), 1847, in 1849 there were a few, 1851 (one record), 1855 (rare, *C. edusa* common), 1856 (two records), 1857 (very

common, as also was *C. edusa*), 1858 (common), 1859 (one record), 1867 (one record), 1868 (very abundant, *edusa* was not common), 1869 (one record), 1870 (scarce), 1872 (common, not so *edusa*), 1875 (abundant), 1876 (common). *C. edusa* was abundant in 1804, 1808, 1811, in 1825 (one), 1826 (very abundant), 1831 (plentiful), 1833, 1835 (both species common), 1836 (common), 1839 (common, many in June), 1843 (abundant), 1844 (very common), 1845 (scarce), 1847, 1848 (one record), 1851 (one record), 1852, 1855 (common), 1856 (common), 1857 (very common, recorded to November 18th), 1858 (very common, particularly in June, also to November 7th), 1859 (very abundant), 1861 (scarce), 1862, 1865 (common), 1867 (several), 1868 (common, but *C. hyale* much more so), 1869 (several), 1870 (scarce), 1871 (one record), 1872 (not uncommon), 1875 (very common), 1876 (common). In 1877, *C. edusa* swarmed from Orkney (W. Tait) to Land's End (Miller), and from Pembroke (Barrett) to Lowestoft (Laddiman). The spring abundance was marked about the middle of May, chiefly in the south and west, and by the end of the first week of June the insect was pretty well distributed. Continuous broods were developed throughout the summer and imagines emerged in the open until November, and yet in 1878, the only records appear to be three imagines seen on April 18th, in Reading and Oxford, three others at Ryde, Isle of Wight, on April 22nd, one on May 18th, in one of the north London suburbs, and in the autumn scarcely a specimen was observed, suggesting that the few that survived the winter were not sufficiently powerful to propagate with any degree of success. In 1879 immigrant *C. edusa* were observed in May and June, but the wet weather must have decimated the larvæ, as the autumnal emergence was only abundant in a few places on the south and south-eastern coasts. The most recent occasion on which both species appeared in the same year took place in 1892, when, during the first week of June, the sudden appearance of specimens was almost simultaneously announced from a majority of the English counties, *C. edusa* being, however, much more common than *C. hyale*. These, which were without doubt immigrants —for experience suggests that our climate is unsuited to the larvæ of this species during the winter (see, *Ent. Record*, vii., pp. 250-253)— soon laid their eggs, and, by the end of July, their progeny began to emerge, and our clover-fields became quite brilliant with vast numbers of both species. Along the Mediterranean littoral, where the climate is so favourable to the existence of many species, *C. edusa* is to be found in abundance every year, a succession of broods occurring, whilst the almost entire absence of cold weather does away with the necessity for prolonged hybernation. From these centres it would appear to spread, sometimes in vast numbers, so as now and again to reach our shores, or even to Scandinavia, but more frequently in smaller numbers, its dispersal being confined to the southern countries of Europe, where the species has the greatest chance of existence.

Bringing its southern habits to England when it immigrates, it lays eggs which in due course produce a summer emergence in July and August, the females of this brood immediately laying their eggs as they would have done in the warmer climes from which their parents came. The caterpillars emerge from the eggs, and for a short time all goes on well enough, and a fresh lot of imagines may even emerge in October and November and the females lay their eggs, but

these late larvæ are exposed to the uncertainties of our winter, and a severe frost or a few days of continued cold and wet, and the whole brood is exterminated, although occasionally a few odd larvæ appear to survive a mild winter in a state of hybernation, in some sheltered spots on our southern coasts. This was so in the winters of 1877-1878, and 1892-1893; but the imagines that these produced appear to have been wanting in vitality, and unable to reproduce an autumn brood. In 1877 and 1892, when *C. edusa* was with us, literally in millions in August, we saw as many as a dozen hustling one another for the honied delights of a single clover flower, and although they were found flying about the outskirts of our towns until late in November, their progeny was practically exterminated during the few succeeding weeks; whilst from the immense multitude of feeding larvæ that must have been in existence in November, 1877, only a few solitary imagines as we have already stated, appeared the following year, and with the exception of a few isolated specimens none were seen in England for the next fifteen years.

It may be here worthy of mention that, in 1899, *C. edusa* was comparatively scarce in England, yet it was more abundant in Ireland than it had been for very many years, especially in the south-western counties—arrivals were seen in early June, their progeny began to emerge at the end of July, and yet another brood in late September and early October (Wolfe, *Irish Naturalist*, viii., pp. 218-220). Cruttwell records a remarkable fact about the August emergence of this flight at Renvyle, on the Galway coast, for of a large assemblage (several hundred specimens) which had established itself along a narrow strip of flowery meadow land, about half a mile in length, he was unable during several days to detect a single female specimen.

That *C. edusa* is abundant in the Mediterranean region from February to May is a well-known fact. Walker says that it is on the wing at Gibraltar all the year round (*Ent. Rec.*, vii., p. 253). It is recorded as abundant at Tangier in February, at Lambessa in February, along the Riviera in February and March, &c. (*Ent. Rec.*, vii., pp. 251-3; viii., pp. 36-37). That the insect has a remarkable power of flight is well known, and when the writer's *British Butterflies* was published, the reviewer of one of the leading daily papers had only two objections to offer, one of which was that the author did not state that *C. edusa* was the swiftest British butterfly, and that one of Alpheraky's dragoons rode over two miles before he could capture a specimen of *C. aurora*. Longstaff notes *C. edusa* flying over the Pass de Teyde, on Tenerife, at a height of 10,000ft., whilst in August, 1898, we ourselves saw a specimen madly careering high over the summit of the Mont Cenis pass, travelling from France into Italy, and at an elevation (above 7000ft.) quite out of the ordinary range of this species.

The Guests of Ants and Termites (with plate).

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

(*Continued from p.* 43.)

The striking resemblances of the guests to their hosts, "Myrmekoidie" (ant mimicry), vary even more than the formations of the antennæ. Both true and pseudo mimicry are to be found in the guests, the latter is to be found in *Scydmaenidae* and *Anthicidae*. The

former protects its owners from the attacks of Insectivora on account of their resemblance to warrior ants, and is also to be found in other species besides the true guests, *e.g.*, *Clerus formicarius* and the large tropical *Cicindelidae* of the genera *Tricondyla*, *Myrmecoptera*, &c. As a rule this kind of mimicry is only found in animals that live in the neighbourhood of ants' nests—species of bugs of the genera *Systellonotus*, *Alydus*, *Nabis*, *Myrmecoris*, &c., are examples. These latter are, in many cases, ant-robbers, and draw a twofold advantage from their dwelling-place, *i.e.*, of protecting themselves from their enemies, and of having easy access to their prey. A third kind of mimicry exists, the purpose of which is to deceive the ants themselves, ant mimicry, in fact, in the true sense of the word. This kind of mimicry is only found in the true ant guests, and is consequently a trustworthy character by which to recognise them. This third kind of mimicry varies in connection with the host's powers of sight, whether they have well-developed eyes or are nearly blind. In the case of well-developed sight in the hosts, the mimicry, being intended principally to deceive the host's eyes, begins with a similarity of colour and reaches perfection in the imitation of the structure of the host's body. This rests more on deceptive reflections of light than on any real similarity of form, which is explained by the fact that the eyes of the ants are not strong enough to perceive shapes and forms. *Lomechusa strumosa* (pl., fig. 2), occurring with the blood-red robber-ant (*Formica sanguinea*), gives us one of the most beautiful examples of this kind of mimicry. A less perfect example is seen in the glossy-black *Myrmedonia funesta* and *laticollis* that live with the glossy-black ant, *Lasius fuliginosus*. It is certainly not by chance that the most like this ant in colour of the six species living with it is the one most often found. These examples show that mimicry calculated to deceive the ant is found both in the true guests (*Lomechusa*) and in the hostile lodgers (*Myrmedonia*). In the former case it furthers the friendly intercourse between guest and host, and in the latter it hides from the hostile watchfulness of the host the rascal, whose size would otherwise make him noticeable, and who now appears as a wolf in sheep's clothing. This difference in the mimicry of *Lomechusa strumosa* and *Myrmedonia funesta* is explained by the totally different intercourse between the two species and their hosts. The similarity is more perfect in the *Myrmedonia*, because it hides itself like a murderer in the nest, and only creeps up to isolated ants, whereas the *Lomechusa* is accustomed to live amongst the ants as their spoilt pet. An isolated *Lomechusa* has hardly any resemblance to an ant, being much broader and plumper, but when it sits in the midst of ants its resemblance is so illusive that it can hardly be found. The light which is reflected from the concave sides of the thorax appears to the eye like the narrow back of the ant, and the rolled-up abdomen of the beetle reflects the light in the same way as the rounded abdomen of a fat ant. Such reflections of light would be useless in *Myrmedonia funesta*, as it is not in the habit of sitting in the midst of the ants. Its mimicry limits itself to such items as are of advantage to an isolated beetle, *i.e.*, the glossy-black colour, narrow shape, and rolled-up abdomen. This mimicry is intended to deceive the ants alone, as when the *Myrmedonia* finds itself confronted by a stronger enemy it protects itself in quite a different manner by rolling itself up and pretending to be dead. It then looks like a small lump of earth.

The mimicry of guests associating with blind or nearly blind ants takes quite a different form, as it only seeks to deceive the sense of touch. It begins with a similarity of structure and hair-growths between guest and ant, and develops into a close similarity of form in the different parts of the body, more particularly in the antennæ. The best examples are to be seen in the *Eciton* guests of Brazil. The notorious "wander-ants," the terror of all small animals, belonging to the neo-tropical regions, have in their suite a number of different guests, especially beetles belonging to the *Staphylinidæ*, who accompany these robber-bands, either on foot or riding on the egg-clusters. In 1891 I had already described twenty-one species of *Eciton* guests, and since then several very remarkable species have been sent to me. Mimicry plays the principal part in assisting these guests to live in such dangerous society. Not only do they receive no harm, but they are even allowed to help themselves to the prey and offspring of their thievish hosts. Eight of these twenty-one species of *Eciton* guests mimic their hosts. It can be proved that these are cases of true mimicry (*i.e.*, to deceive their hosts) by comparing them with the mimicry of guests of clear-sighted ants. The former deceive the host's sense of touch in the same way that the latter deceive the host's sense of sight. *Eciton* mimicry reaches its highest state of perfection in *Ecitomorpha simulans*, Wasm., a guest of *Eciton foreli*, Mayr, and in *Mimeciton pulex*, Wasm. (pl., fig. 4), a guest of *Eciton prædator*, Sm.

A superficial glance would not suffice to understand this kind of mimicry, as the similarity is not calculated to deceive the sight but the touch. It is necessary to place each part of the mimic's body under the lens, and compare it with a similar part of the body of the smallest worker-ants of the host. One will then recognise a true *Eciton* mimic, whereas, to the naked eye, by the side of the glossy-black ant it looks like a long-legged ruby-red flea—hence its name "pulex." The mimicry here exhibited is so perfect that by closer observation one would think one had a real ant before one instead of a beetle. Its head is shaped like a small *Eciton* head, its thorax stretches out and is narrowly arched like the back of an *Eciton* and contracted exactly in the same place as the ant's thorax, and on both there is a large fissure. Then there comes an apparently unconquerable obstacle. How is the very broad knotty-shaped first segment of the double-ringed hind-body of the ant to be represented by a beetle that should possess elytra in this identical spot? The elytra of the *Mimeciton* are no longer elytra because they do not cover any wings, nor have they a suture. They form a knotty shaped roof, from under which the narrowed base of the abdomen proceeds in the same manner as the second part of the abdomen of the *Eciton*. The abdomen is fat and arched like that of a well-fed ant, and the antennæ are whip-shaped and have a long first joint identical with those of the ant. To make the mimicry perfect the beetle has even lost its compound eyes, which are replaced by tiny ocelli like those of the ant. It has the long spider-legs of the wander-ant, but this also serves it for a practical purpose, *i.e.*, to keep up when running in company with these capricious vagabonds. What is even still more astonishing is the fact that the comb-shaped spur on the extremity of the ant's anterior tibiæ is reproduced in the beetle by a spur-shaped hook (see pl., fig. 4). If there are anywhere in nature examples of true mimicry, they are to be found

amongst the guests of the genus *Eciton*. There is, of course, no similarity of colouring, or at any rate only a chance resemblance, between these guests and their nearly blind hosts. The wander-ants of the genus *Eciton* have only simple ocelli, instead of compound eyes, the former being more imperfect organs of sight than the latter. The size and shape of these ocelli, however, differ in the different species. They are very small and flat in *Eciton praedator* and *E. coecum*, and, in consequence, their mimicking guests, *Ecitonilla*, *Ecitonides*, and *Mimeciton*, possess no similarity of colouring. The smallest worker-ants of *Eciton foreli* have got comparatively larger and more arched ocelli than the two other species. On this account I am still in doubt whether there exists any true similarity of colouring between these little black workers and their guests. These guests have certainly no similarity of colouring with the big yellow warrior-ants. The question of colouring is quite a secondary one, as the structure, hair-growths, and shape of the body, calculated to deceive the sense of touch, are so apparent. The case is quite different, however, with *Eciton californicum* of North America. I was not a little astonished to see in a guest sent me by Father Jerome Schmitt, O.S.B., which he had discovered with this ant in North California, that the rust-red colour corresponded perfectly with that of its host. When I looked, however, at the eyes of the latter through a lens the enigma was solved. They were comparatively well-developed, arched, and twice as big as those of the same sized workers of *Eciton praedator*. It is, therefore, apparent that *Eciton californicum* is able to see the colour of its guest, and so this element has been changed also by the aid of mimicry.

(*To be continued.*)

Notes on Orthoptera in the Siamese Malay States.

By N. ANNANDALE, B.A.

The following are some general notes on the habits of the Orthoptera made last year during the months of April to September, while I was a member of an expedition sent out to Lower Siam under the auspices of the Cambridge University and the leadership of Mr. W. Skeat, of Perak, and with the kindly and most generous aid of the Siamese Government. I hope soon to publish a more detailed account of some of the insects mentioned, more particularly of the flower-like Mantids and of certain of the Locustids.

Earwigs are rare in those parts. A few species may be caught round the lamp on some evenings; on others, apparently identical as regards temperature and weather generally, hardly an insect of any kind is attracted by the flame. In the plains these fertile nights are commoner than they are among the hills or in the midst of thick jungle. A few earwigs, mostly immature forms, may also be found under the bark of dead trees or in rotten timber. Sometimes a dug-out canoe on the river is infested by them. In one cavern of the Jalor caves, *Chelisoches morio*, Fabr., abounded among the bats' dung on the ground; and might be taken by laying a dry object, such as a camera-case, in the middle of the cavern. Numbers both of adults and of larvæ would soon crawl upon it, if it were left in the dark for a few minutes. The cave specimens of this common species most probably sought the outside world in the evening, as they were only found in a

particular part of the cave, not far distant from a place where the roof had collapsed, admitting a certain amount of light and offering an easy egress.

The walls of the same cavern were hidden in places by dense crowds of a species of *Blatta*: the wingless females and larvæ of a *Perisphaeria* mined in the bats' guano, the winged males mingling with the larger species on the wall. Thousands of small *Stenopelmatidae* leapt about on the floor, and sat where they could find unoccupied room on the walls. All these appeared to feed on bats' dung, and the Locustids were the prey of enormous *Pedipalpi*, which crawled in the open cave, groping for their food all round them with their feeler-legs crossed over their backs. Outside the caves, the smaller, more lightly built, cockroaches, were mostly diurnal, flitting about in the clearings and the sunnier reaches of the jungle. The common house cockroach of the country is *Periplaneta australasiae*. Large colonies of this species conceal themselves in the hollows of the bamboos of which a Malay house is principally built. But the most powerful forms, such as *Panesthia*, are hidden during the day in fallen trees and branches, into the rotten parts and crevices of which the different species of this genus are well adapted to insinuate themselves, by reason of the pushing power of their spiny hind legs, which are so strong that it is extremely difficult to hold the insects between the finger and thumb. On one occasion I found a specimen, probably *P. javanica*, in a rounded chamber in the very centre of a great log, with several small white cockroaches crawling round it. The large individual seemed to be healthy, but only the jagged stumps of its wings remained; it is probable that the others had eaten them off. The colourless specimens were not all of the same size, and possibly they were immature forms of the same species as the other. Some large specimens in the Hope Collection at Oxford appear to have lost their wings quite as completely, only the same jagged edge remaining, but there is no information in their case as to how the mutilation came about. A number of forms, belonging to different genera of the Malay *Blattidae*, bear a more or less marked resemblance to wood-lice, and some may even be mistaken for the Crustaceans. As a rule, such forms are found among dead leaves or under stones, in places which the wood-lice also frequent. I do not believe, however, that this resemblance is mimetic, for it is hard to see how mimicry could benefit either party, or both, in this case; it seems rather to be adaptive; wood-louse and cockroach, living under the same conditions, have developed the same general shape of body. The cockroaches, however, which had the most surprising habits of those which came under my notice, were certain aquatic forms belonging to the genus *Epilampra*. While we were staying in a hill-clearing on the boundary of the States of Nawnchik and Jalor, the gelatine on some photographic plates, which were left to dry in a small hut built over the stream, was eaten away during the night. Our Malay servants assured me that the damage had been done by "lipas ayer," or water-cockroaches, but I did not believe them. A few days later one of them pointed out to me a cockroach crawling along the sandy bottom of a small mountain rivulet, and afterwards I secured specimens both from a jungle burn in Rhaman and from the Kelantan river. In the river the wingless females sit on floating logs, in the crevices of which they deposit their egg-capsules, just above the water-

line, and dive upon the least disturbance, remaining under water for some minutes, and sneaking to the surface again beneath the shelter of the log. They do not appear to take down much air with them, as no part of the body looks silvery under water. I have occasionally seen the winged males rising from the surface of the river and taking flight, but I was never able to detect them actually in the water. The jungle specimens were all females; they were taken either in the water or among the matted roots with which the sides of the stream were covered.

The best known cricket in the Malay peninsula, though very few people have actually seen it, is the "Singing earthworm" of the Malays and colonists. It is a species of *Gryllotalpa*, which lives in holes in the ground, whence it gives forth in the evenings a deep organ-like note, so loud, and so musical, that, until one has had some experience of the jungle noises, one can hardly credit it to an insect, much less to an earthworm. Other species of crickets sing about the houses, producing a sound like a gritty piece of chalk on a blackboard, which is annoying at night. The number of species and individuals, however, is limited.

Among the lalang grass (*Imperatia koenigii*), which is the earliest and most pernicious of the weeds that appear in a Malay clearing, the orthopteran life is so rich that the general name "belalang" has been bestowed on all grasshoppers and locusts by the Malays, who have a surprising knowledge as to the facts of the biology of their country, though their theories are at least as wild as those of some European zoologists. They know, for instance, that a certain large parasitic Nematode issues from the body of a Mantis. From this they have concluded that the worm is the child of the insect. They have further imagined that its father must be an earthworm, and they have invented a story which, to compare little things with great, may be likened to that of the origin of the Cretan Minotaur. None of the species that live among the "lalang" are of any great size, the largest not being more than two inches in length. They are mostly Acridiids, but a few crickets, larval Mantids, and cockroaches may be found with them, and, on the hills, certain Phasmids and also species of *Necrosia*.

(To be concluded.)

COLEOPTERA.

Scolytus rugulosus in Prunus lauro-cerasus. — That *Diloba caeruleophala* and other lepidoptera eat the leaves of the common laurel is no doubt matter for surprise, and so every now and then it comes up for notice in the magazines, I suppose, like the big gooseberry and the sea-serpent. That the wood and bark should make good insect food is, perhaps, less against our preconceived opinions, but perhaps sufficiently interesting to note, though it may have been frequently done already. I believe I have somewhere noted *Semasia woeberiana* in the bark of cherry laurel, and I think I have seen the work of *Scolytus pruni* therein. I have recently seen the work of *S. rugulosus* in dead branches of laurel here at Reigate.—T. A. Chapman, M.D., Betula, Reigate. *January*, 1900.

A Few Notes on Suffolk Coleoptera.—Having had the pleasure of a couple of days' collecting in the Ipswich neighbourhood with Mr.

Claude Morley, last September, a few notes on the results may be useful as an addendum to Mr. Morley's Suffolk list. The weather was all that could be desired, and with the aid of bicycles we covered a considerable extent of ground. I am greatly indebted to Mr. Morley's able guidance for the chance of taking a number of species new to me in a living state. I had the good fortune to capture three species new to the Suffolk list, *viz.*, *Apion dissimile*, *Sphindus dubius*, and *Ennearthron cornutum*. The first-named was swept off its usual food-plant, *Trifolium arvense*, in a sandpit near the Foxhall plateau. I had had the pleasure of making the acquaintance of this *Apion* only the week before at Deal, on the same plant. The *Sphindus* and *Ennearthron*, as well as *Cis nitidus*, were bred out of some fungus which I brought away with me. Mr. Morley also added a species new to the list in *Trachyphloeus spinimanus*, of which a single example turned up in a crag-pit. The following species also are noteworthy: *Olibrus pygmaeus*, not uncommon at roots of plants; *Olibrus liquidus*, by sweeping, this has only occurred once before in the county; *Nitidula rufipes*, several in the skeleton of a calf at Foxhall, rare in Suffolk; *Nitidula quadripustulata*, with the last; *Dermestes vulpinus*, uncommon, and not previously taken at Foxhall; *Dacne humeralis*, bred in some number from a large fungus, and new to the Ipswich district; *Phyllotreta consobrina*, I swept a few of this in Bentley Woods, hitherto only taken at Brandon; *Aphthona lutescens*, not uncommon at Foxhall; *Psylliodes affinis*, I swept a specimen of this much suffused with black on the elytra; *Mecinus circulatus*, a single specimen in a crag-pit, which particular pit, Mr. Morley tells me, is almost its sole habitat; *Apion rubens*, Bentley Woods; *Apion ranipes*, not uncommon by sweeping; *Balaninus turbatus*, one in Bentley Woods off hazel, of rare occurrence in the county; *Gymnetron melanarium*, one in Bentley Woods, thus confirming the record of Stephens and Curtis as "found in Suffolk"; it has not been taken since their time; *Centhorrhynchus melanostictus*, off *Mentha*, at Foxhall, the pupa-cases are very pretty; *Amalus scortillum*, abundant in a crag-pit.—B. Tomlin, B.A., F.E.S., Stancliffe Hall, Matlock.

Anthicus bimaculatus, Ill.—I took four specimens of this rarity on May 3rd last at Pyle, in South Wales, on the sandhills. No two are quite alike, but they vary from the form shown in Fowler's figure with a minute black dot to one with a regular black band across the elytra. It was an ideal day for sandtraps, with a steady wind blowing, and the following species were taken in the same way: *Limonius cylindricus* (abundant), *Centhorrhynchus asperifoliarum*, *Coeliodes fuliginosus*, *Cholera angustata*, *Hister neglectus*, and *Psammobius sulcicollis*.—Ibid.

ORTHOPTERA.

How does the earwig fold its wings?—One evening in the beginning of August last I boxed a specimen of *Labia minor*, and as it was extremely active, and continually flitting about, it gave one ample opportunity for observing the expanding and folding of its wings. I cannot confirm the statement of Rev. J. G. Wood (*Insects at Home*) that the forceps are used. I watched the operation not once but many times. The wings were shot out rapidly with a jerk, then

as soon as the creature landed on the bottom or side of the box, they remained a short time their full length over the back of the abdomen, and while watching for the forceps to come into use were quietly drawn up under the elytra. Further observation revealed the *modus operandi*; the forceps were not used at all, but the femora of the middle pair of legs raised so that the knees touched the hinge-joints of the costal nervures, this allowed them to bend, the wings folding automatically as they were drawn over the back and under the elytra. The wings were not seized by the forceps and by them tucked away; the insect can and does secure its wings properly without their aid. Confined within the limits of an ordinary glass-bottomed box and observed indoors under a good light until I was tired of watching, the insect being very active, so much so, that it might have been one of the Saltatoria, I most positively affirm that in no one instance were the forceps used. Indeed, if, as Wood says, the primary use of the forceps is to pack the wings under the elytra, what, one may ask can be their purpose amongst the apterous species? Perhaps other students who have had the opportunity, may be induced to relate their observations upon the matter.—HARRY MOORE, F.E.S., 12, Lower Road, Rotherhithe, *February 19th*, 1900. [That the forceps cannot be exclusively used for the operation of folding the wings is obvious, for about half the known species of earwigs are incapable of flight; in many exotic forms, too, the forceps are too complicated and clumsy to be of any assistance for such a purpose, and are sometimes even longer than the body. They may serve as weapons of offence or defence. According to Kirby and Spence, *Labidura riparia*, Pall., when disturbed, turns its tail over its head, giving it a most alarming appearance. The forceps are almost invariably more simple in the female than in the male, so they may be useful for sexual purposes.—M.B.]

ORTHOPTERA AT "SUGAR."—I was staying near Torquay, south Devon, from August 5th-16th, 1899, and "sugared" almost nightly for Lepidoptera, and at the same time the following Orthoptera were taken, which have been kindly verified by Mr. Burr. *Forficula auricularia*, L., this species literally covered every patch of sugar nightly; *Ectobia lapponica*, L., several occurred; *Leptophyes punctatissima*, Bosc., several taken; *Meconema varium*, Fab., a few; *Locusta viridissima*, L., of this fine species several could have been taken every night; *Thamnotrizon cinereus*, L., several; *Platycleis grisea*, Fab., several.—A. H. HAMM, 52, St. Mary's Road, Oxford. [*F. auricularia* is well known as a visitor to sugar. *E. lapponica* is noticed by Mr. Milton (*Ent. Rec.*, xi., p. 333). *L. punctatissima* has been taken at sugar by Dr. Dixey, and *M. varium* is a familiar visitor and was noticed by McLachlan in 1863 and 1876, by Boswell in 1875, and recently by Lucas. *L. viridissima* apparently comes with double purpose, as Boswell records it feeding on the sugar and eating the moths attracted to it (*Entom.*, 1875, p. 165). *T. cinereus* has been taken at sugar by Lucas, but *P. grisea* is a less familiar visitor. I am unaware that it has been recorded before under similar circumstances.—M.B.]

HOW LONG DOES BLATTA ORIENTALIS, LINN., ♀ CARRY ITS OOTHECA BEFORE DEPOSITION?—Various authors say from a few days to more than a week. On August 23rd last I boxed a ♀ which shortly after began to extrude its egg-case. Having for some time been collecting stray notes on the ova of Orthoptera I kept the insect under close

observation. The whole process lasted about twelve hours. The case hardens gradually upon exposure, the portion still retained in the oviduct being soft and putty coloured. It seemed to me that when the whole capsule was ripe the ♀ could no longer retain it. Amongst others, Blatchley says (*The Blattidae of Indiana*) that the ♀ *B. orientalis* carries its ootheca for a week or longer; *Phyllodromia germanica*, for several days with half or three-fourths of its length protruding, and mentions that from one with protruding ootheca placed in a bottle at 11 p.m. the young had emerged at 8 the following morning. *B. orientalis* takes longer to hatch (here again authors differ—from any time up to a year). My difficulties are these (*a*): Can the ♀ carry a fully ripe capsule? (*b*) If the portion retained in the body of the ♀ remains soft, can the young be as fully developed there as in the part extruded a considerable time before? I have always understood that the young emerge much about the same time as one another, but have had no opportunity for testing it.—Harry Moore, F.E.S., 12, Lower Road, Rotherhithe, *February 19th*, 1900.

VARIATION.

Anthrocerid aberrations with dark instead of red spots.—In *British Lepidoptera*, vol. i., p. 423, I noticed those species of *Anthrocera* of which aberrations with brown-coloured (instead of red) spots had been recorded. To these M. C. Oberthür adds *A. achilleae*, bringing the total number up to six species. The specimen was captured at Cauterets last summer.—J. W. Tutt.

Parallel colour variation in larvæ and pupæ.—I observe that Mr. Walker asks (*ante*, vol. xi., p. 269) whether the brown larvæ of *Ennomos fuscantaria* always produce brown pupæ, and green larvæ green pupæ. I can answer it in the affirmative as to both *Zonosoma annulata* and *Z. porata*. The larvæ of *Z. annulata* are generally green, but we occasionally meet with brown ones. These latter are most common among autumnal broods, and when breeding the var. *obsoleta* last autumn (a third brood) I found a third of the larvæ were brown, and their pupæ also are similarly coloured. Doubtless the change from type is protective, assimilating the larvæ to the dying leaves of the maple, but in this case, though the maples were already changing a good deal, the larvæ were supplied throughout with green leaves only. A hereditary tendency to the seasonal change must, therefore, be well established.—W. S. Riding, M.D., F.E.S., Buckerell, E. Devon.

SCIENTIFIC NOTES.

Hypolimnas misippus, Linn., taken in the Atlantic Ocean.—Of the five specimens of *Hypolimnas misippus*, Linn., sent to me (and mentioned *ante*, vol. xi., p. 322) as part of a swarm taken by Captain Ellis in the Atlantic Ocean, two are males and three females. Of the latter one is typical *misippus*, while two are the var. *inaria*, Cr. This preponderance of the variety over the type, strongly indicates that the specimens had flown from some part of the Ethiopian region, and probably either from the tropical west coast or from the north-east or east coast. Thus *inaria* is very common at Aden, and abundant at Dar-es-Salaam. At Ashanti on the west, it seems to be the dominant form, as five

females I have recently seen from this locality were all *inaria*. The facts of its distribution, combined with a knowledge of the position of the ship, ought to enable us to judge of the coast from which the specimens found migrated with tolerable accuracy.—E. B. Poulton, M.A., F.R.S., Oxford.

NOTES ON COLLECTING, Etc.

Distribution of Sympetrum sanguineum in Britain.—Referring to your note (*ante* vol. xi., p. 232) on the distribution of *S. sanguineum*, there is no doubt that this species is a native of Britain, and occurs commonly every year in the Wicken Fen ditches, and when we were at Deal it was abundant in the broad ditch crossing the sandhills.—G. T. Porritt, F.L.S., F.E.S., Crosland Hall, Huddersfield.

Larvæ of Proutia betulina full-fed in November.—Between November 12th and 26th I found near here 58 cases of *Proutia betulina*. I at first thought them to be merely empty cases, but they nearly all contain apparently adult larvæ. They will, I hope, survive the winter. —F. G. Whittle, Southend.

Acherontia atropos in Essex.—A brother entomologist living near Southend tells me that more than 100 pupæ of *Acherontia atropos* were taken to him by potato-diggers during the last autumn (1899).—Ibid.

Acherontia atropos in Norfolk.—I, too, can report the occurrence of larvæ of *Acherontia atropos* in this part of Norfolk in some numbers last season. The first larva was brought to me July 24th, 1899, and produced a fine imago under natural conditions on September 20th. Another was brought on July 28th, three others came in during August, and are going over. I have heard of the finding of other larvæ in this neighbourhood, which, however, failed to reach me.— E. A. Atmore, F.E.S., King's Lynn.

Smerinthus populi in western Scotland, with some notes on its Habits.—I have recently been re-reading Mr. Bacot's paper on "The genus *Smerinthus*," in vol. ii. of the *Ent. Record*, pp. 173-181. The author of the paper there quotes Barrett as stating that *Smerinthus populi* is not found in the west of Scotland. I have repeatedly taken larvæ in Buteshire—the Isle of Arran, also at Bridge-of-Weir in Renfrewshire. The last date for the former locality being August, 1899, and for the latter locality August, 1896. I have taken the moth flying heavily along a roadside at dusk. Its flight is slow and laboured and closely resembles that of *Acherontia atropos* which I frequently saw on the wing in India some years ago. It is strange that the larva of *S. populi*, although it burrows when full-fed, generally comes to the surface in captivity before it turns, however much earth is given it.— H. C. Arbuthnott, Downside, Otley Road, Harrogate. *February 10th*, 1900.

Egg-laying of Macroglossa fuciformis (the honeysuckle bee-hawk).—*M. fuciformis* is said to oviposit on the wing, *vide*, Buckler's *Larvæ*, &c., vol. i., p. 121. I once, however, got the moth to lay in captivity, although, on that occasion it had spent some time in a killing-bottle and was believed to be dead when taken out. The two eggs subsequently laid were fertile and produced healthy larvæ.—Ibid.

Butterflies around Lucerne in late August.—The following list of butterflies taken in the neighbourhood of Lucerne during the last week of August and the first week of September, 1899, may be of

interest. The principal ground worked was from Weggis to the top of the Rigi, and from Vitznaw to the Rigi-Kulm, and the Bergenstock, which is almost opposite Weggis, on the other side of the Lake of the four Cantons. On Pilatus Kulm (6,995ft. high) the only butterflies seen were swarms of *Aglais urticae*, and an almost black butterfly* of which I was not able to secure a single specimen, as they were on a very steep bank and quite out of reach; just below the Tomlishorn, the highest peak of Mont Pilatus. The commonest butterfly, not only on the mountains, but also in the immediate neighbourhood of Lucerne, was *Colias hyale*, and in very fine condition, its range extended almost to the summit of the Rigi. *Argynnis lathonia* was found in one place only, on an open space in front of a *pension*, on the way up the Rigi from Vitznaw, it was also in splendid condition. *Euranessa antiopa* was I think over, only two specimens were seen, one at Weggis and the other at Andermatt, in front of the Grand Hotel. Although the weather was splendid during the whole fortnight that I spent in Switzerland, I think my visit was too late in the year from an entomological point of view. The following were the species taken: *Dryas paphia, Argynnis aglaia, A. lathonia, Melitaea didyma, M. parthenie, M. athalia, Polygonia c-album, Vanessa io, Euranessa antiopa, Aglais urticae, Pyrameis atalanta, Limenitis sibylla* (much worn), *Papilio machaon, Parnassius apollo, Colias hyale, C. edusa, Pieris napi, P. rapae, P. brassicae, Gonepteryx rhamni, Pararge megaera, P. egeria, Erebia medusa, Coenonympha pamphilus, Epinephele janira, Chrysophanus dorilis, C. phlaeas, Zephyrus betulae, Polyommatus corydon, P. bellargus, P. icarus,* and *Leucophasia sinapis.*† *Macroglossa stellatarum* was common in the gardens at Weggis, on the Bergenstock, and other places on both sides of the lake.—P. Gerald Sanford, F.I.C., F.C.S., 20, Cullum Street, E.C.

The Phibalapteryx aquata of the "Tugwell collection."—I see that in your article on *Phibalapteryx aquata* (*ante*, p. 36), you speak of there having been two specimens of it sold with Mr. Tugwell's collection, one of which was bought by Dr. Sequeira. I bought the other and now have it, but there was no record to show from what locality it came. It is smaller than the specimens of *P. vitalbata*, which I bought in the same lot. I bought the lot (51) because it contained a fine bred series of *Cidaria picata*. It seems to have been a fortunate purchase if this is, indeed, a specimen of *P. aquata*.—J. C. Moberly, M.A., F.E.S., 9, Rockstone Place, Southampton. *February 15th*, 1900.

Macroglossa stellatarum in February.—A specimen of *Macroglossa stellatarum* flew into a grocer's shop on February 28th, and was hovering over an open box of prunes, when it was knocked down by the shopman.—W. A. Luff, Mount Pleasant, Burnt Lane, Guernsey. *February 28th*, 1900.

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* Most probably *Erebia glacialis* var. *alecto*.

† Also *Polyommatus damon, P. dorylas, Nomiades semiargus, Melitaea dictynna, Brenthis dia, B. selene, B. pales, Argynnis niobe* var. *eris, Erebia curyale, Callimorpha hera*.

PRACTICAL HINTS.

Field Work for March and April.

By J. W. TUTT, F.E.S.

1.—The trunks of oaks should be searched during the afternoon in March and April for newly emerged imagines of *Amphidasys strataria*.

2.—*Anisopteryx aescularia* is sometimes to be found in numbers by searching tree-trunks in the late afternoon. It is often also abundant on the framework of roadside lamps in the early morning.

3.—During the first fortnight of April search the honeysuckle by night for the young larvæ of *Pericallia syringaria*.

4.—In open parts of woods, high up around the tops of young aspens, the imagines of *Brephos notha* are sometimes to be seen in March and April on hot sunny days in considerable numbers.

5.—Spruce fir cones collected in March and April should be overhauled for larvæ of *Coccyx strobilana* which feed up and pupate therein.

6.—The larva of *Ephippiphora nigricostana* passes the winter in the stems of *Stachys sylvatica* which should be collected in March and April.

7.—The larva of *Grapholitha nisana* feeds in the catkins of sallow in March and April.

8.—*Butalis incongruella* is much overlooked in the south of England owing to its early appearance, we have repeatedly taken it in great abundance in late April and early May on the chalkhills of Kent.

9.—During the first week in April sweep *Calluna vulgaris* on heaths and moors for larvæ and cases of *Coleophora juncicolella*.

10.—As soon as the sallows are in bloom, every warm evening should be spent working those trees that are in sheltered spots. Living females of *Hoporina croceago* should be fed with moistened sugar and given a few oak-twigs with old leaves in a large glass jar, when eggs will be laid freely.

11.—Towards the end of March beat the bare twigs of ash, either trees or hedgerow bushes, after dark, for larvæ of *Cirrhoedia xerampelina*. Feed up on the large unopened buds until the trees break into leaf. By this means some 40 or 50 larvæ were obtained in the spring of 1897, in Suffolk, and a nice series of imagines was bred therefrom (James).

N.B.—Lists of some hundreds of similar "Practical Hints" may be obtained from the preceding volumes.

CURRENT NOTES.

The Entomological Society of London is fortunate in having obtained the services of so excellent a Fellow as Mr. H. Rowland-Brown, M.A., as secretary, in succession to Mr. J. J. Walker. We have no doubt that Mr. Brown will fully keep up the high reputation of our premier society, and prove a worthy successor to the best of his distinguished predecessors.

The President of the Entomological Society of London has appointed Dr. T. A. Chapman, F.Z.S., Mr. W. L. Distant, F.E.S., and Mr. C. O. Waterhouse, F.E.S., to be Vice-Presidents for the year.

In the *Annales de la Société entomologique de Belgique*, M. A. Lameere records three additions to the list of Orthoptera known from Belgium. The first is *Oecanthus pellucens*, Scop., the second *Caloptenus italicus*, L., and finally *Stenobothrus longicornis*, Latr. This latter species is most interesting. Hitherto it has only been recorded from certain marshy localities in central France. The specimen upon which M.

Lameere bases this addition, has been in the Brussels Museum for some years. It was captured at Laeken by Camille Van Volxem, and has been regarded as *Stenobothrus parallelus*, Zett., var. *explicatus*, Selys (*vide*, *Ent. Rec.*, 1899, vol. xi., pp. 244-5).

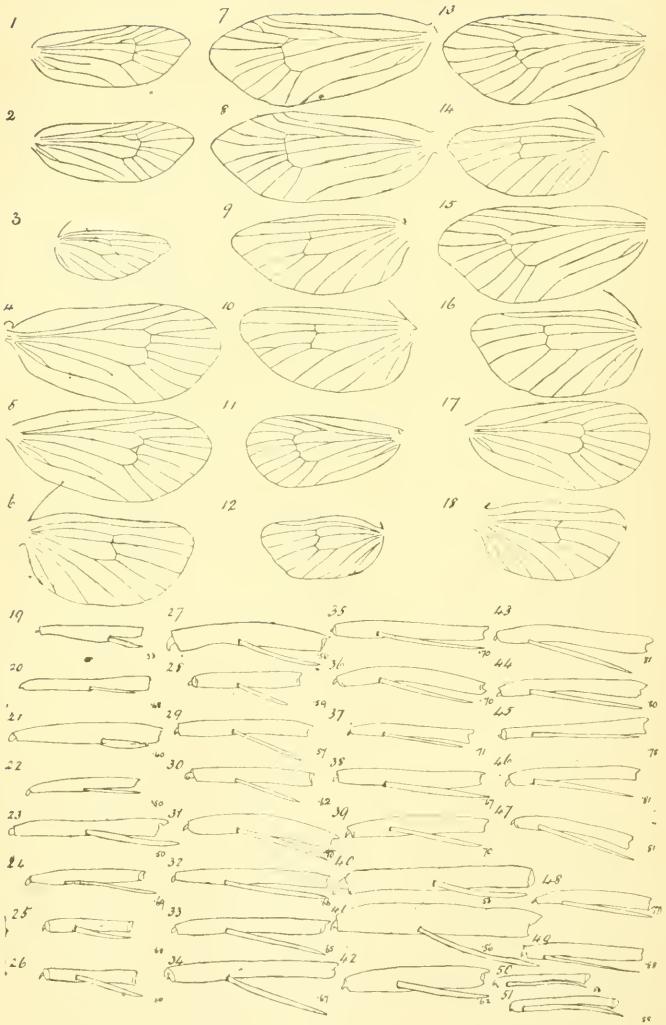
Mr. Tutt would be pleased if every reader of the *Ent. Record* would kindly send on any information at his or her disposal about the following species: *Endromis versicolor*, *Saturnia pavonia*, *Poecilocampa populi*, *Trichiura crataegi*, *Malacosoma castrensis*, *M. neustria*, *Eriogaster lanestris*, *Epicnaptera ilicifolia*, *Entricha quercifolia*, *Cosmostriche potatoria*, *Macrothylacia rubi*, *Lasiocampa quercus*, and *L. trifolii*. The facts might be enumerated under headings—(1) Localities (with counties). (2) Dates of capture (in any stage). (3) Food-plants. (4) Habits of larva and imago. (5) Habitat. (6) Eggs. (7) Larva. (8) Pupa. If put in tabulated form and not included in a letter it would be of great advantage. Those correspondents who have already sent lists, &c., would greatly oblige by adding the data for 1898 and 1899 to their earlier communications. All information will be duly credited in the work to be published to the sender.

The Council of the City of London Entomological and Natural History Society having decided that the publication expenses of the *Transactions* for 1899 shall be met by special donations as in the previous year, it was resolved at the ordinary meeting of January 16th last:—(1) That a special "Publication Fund" be started forthwith. (2) That the secretaries be requested to write to all members that the society have decided to publish their *Transactions* by a voluntary subscription. (3) That the president be instructed to appoint a publication committee composed of subscribers, such committee to have full powers in every respect. All entomologists who wish the *Transactions* for 1899 to be published and are willing to assist in defraying the cost are, therefore, requested to kindly communicate, at an early date, with the treasurer, Mr. C. Nicholson, 202, Evering-road, N.E. Many generous donations have already been promised, and it is hoped that a larger volume may be issued than that of 1898.

Our readers will be pleased to hear that Mr. Burr is collecting the material for a detailed account of the British (including the Channel Islands) Orthoptera. He is in want of material—as to localities, habits, dates of emergence, &c.—from everywhere. He hopes to start the work definitely next autumn, to illustrate it, and to give much space to general questions. Information should be sent to Mr. M. Burr, Dormans Park, East Grinstead.

Many of the subscribers to *The Natural History of the British Lepidoptera*, having written about the publication of Vol. II. in parts, Mr. Tutt desires to state that Part 1 will only be sent to those subscribers who have prepaid their subscription and expressly stated that they require it in parts. As the parts will be bound in paper, a cover to match Vol. I. will be sent to such with Part 2, price 9d. New subscribers to the work are offered, until Vol. II. is published, the chance of subscribing for Vols. I. and II. at 30s. Copies of Vol. I alone can still be obtained at £1 net.

Errata.—Vol. xi., p. 333, line 9, from top, "Lieutenant" should read "Assistant-Paymaster." Vol. xii., p. 41, line 10 from bottom, "125" should read "1246"; p. 55, line 10 from bottom, for "1899" read "1889.—H.D.



Neuration and tibial spurs of the Psychids.

The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XII. No. 4. April 15th, 1900.

Phibalapteryx aquata as a British species.

By L. B. PROUT, F.E.S.

I am naturally much pleased at the addition of another member of my favourite family, the *Larentiidae*, to our British list (*antè*, p. 35), and should like to add a little to what Mr. Tutt has published. When he approached me on the subject of this species, I had so much work on hand that I was only able to tell him just what occurred to me on the spur of the moment. I see from Tugwell's sale catalogue (January 20th, 1896, lot 51) that one of the specimens of *aquata* to which I alluded was included in "*Vitalbata* 5, bred by self, *fine white vars.*," and Mr. Moberly tells us that he bought this lot. It would be interesting to know whether the "fine white vars." (*i.e.*, *aquata*) or only the typical *vitalbata* with them, were bred by Mr. Tugwell himself. I presume the one which Dr. Sequeira got, was in lot 52, where there were "*Vitalbata* 7, bred by self, 1 *pale var.*" (sold for 5s., though including three fine pale vars. of *Cidaria corylata*, &c., &c.). The *aquata* would probably have reached a much higher price if a whisper had not gone round in the sale room that they were not *vitalbata* vars. at all, but a "foreign species." In view, however, of Mr. Tutt's circumstantial record, there seems no reason to doubt the *bona fides* of Mr. Tugwell's examples also.

Mr. Tutt says he cannot "see any real distinction between *aquata* and *vitalbata*, except the difference in the ground colour." I must say the two had never struck me as being exceptionally similar—probably because I have never seen intermediate vars. of either—and I was astounded when I saw the *aquata* in Tugwell's cabinet posing as *vitalbata* vars. But now that the resemblance has once been pointed out to me, I confess that I can see that it is tolerably close. I may remark, however, that *aquata* is a smaller insect (generally *much* smaller), lacks the dorsal darkening of the abdomen, has the lines outside the central area decidedly straighter, perhaps also a somewhat differently shaped wing. Aurivillius says that the ♂ genitalia differ from those of *vitalbata*.

The early stages have been described by Rössler (*Wien. Ent. Monats.*, vi., p. 130), but unfortunately he does not give a side-by-side comparison with those of *vitalbata*, and though I have several times bred the latter, I am afraid I have no notes sufficiently minute to be of use in furnishing any differential characters. I quote what Rössler says, as it may aid in making comparisons in the coming season. He

describes the egg as pale green, soon changing to dark green. Larva slender, the same form as in the related species, but smaller, green, more or less "scherbenfarbig" tinged, or violet-green, or even inclining to brown-red. Dorsal line fine, blackish, swells in first quarter and last third of the middle segments so as to form spots. Subdorsal scarcely visible; in it, on each segment, two black tubercles with hairs. On the flesh-coloured sides runs an irregular dark longitudinal stripe, with a finer one above it. Spiracles appear as dark rings. On each side of them stand two equal-sized tubercles with hairs, the tubercle towards the head is higher, stands nearer to the dorsal line, and is darker. Belly reddish, in its centre a well-developed blackish stripe, swelling in the middle of each segment, and with two paler, irregular ones on either side thereof. Head dark speckled.

The specimens of *P. aquata* in my collection (six only) are all from north Germany, five being labelled Pomerania. In our National collection, there are representatives from southern France, Burgundy, Pomerania, Garz-on-the-Oder, Frankfort (? which), Wiesbaden, &c. To judge from Staudinger's trade-lists, it must be almost as common a species on the continent as *vitalbata*, but Aurivillius only gives one record for Scandinavia, namely Scania, on the authority of Wallengren. It will be interesting to learn whether, as our Editor suggests, other specimens are lying undetected in our British collections.

Note on Psychidea graecella, Milliere.

By J. W. TUTT, F.E.S.

Millière in his *Iconographie*, ii., p. 252, pl. 77, figs. 9-10, described and figured a Psychid species as *graecella* in the following terms:

Fumea graecella, sp. nov. Envergure: 0.014m.-0·015m. Of the size of the smallest examples of *E. pulla* which this species would resemble if the superior wings were rounded at the apex and on the outer margin. This character alone, without the less important ones, will always prevent this insect being confounded with *E. pulla*. *F. graecella* is of a sooty black, dull and hairy; the upper wings are somewhat elongated, wide at the outer border, the apex pronounced, with the external edge cut obliquely. The lower wings are well developed, wide, and rounded. The fringes of all the wings are very long and of a still more pronounced black than the tint of the wings. The antennæ are of normal length with numerous fine pectinations; they are, as also the head and thorax, of a deep black. The abdomen is slender and covered with black silky hairs of no great length; it is very faintly tinted with yellowish at the tip; this is more marked beneath. The case is covered with small cylindrical and agglomerated straws. The case, somewhat bulging centrally, is similar to that of *comitella*, Brd., or of *crassiorella*, Gn. I have under examination many specimens, identical with each other, of this new *Fumea*, which have been sent to me by Staudinger with the simple annotation: "Species nova, de la Grèce" (Millière).

Millière also notes that at the end of April, 1866, he found on the east slopes of the Estérel many cases fixed to the rocks, and that less than three weeks afterwards many males of *F. intermediella* emerged, and amongst them two specimens which were referable to *F. graecella*.

Whether Millière was right or wrong in referring the south France species to *graecella*, we are scarcely in a position to judge, as we have seen none of Millière's specimens, but it would appear that, although he originally described the imago from specimens from Greece, he described the case from his own south France material that he referred to this species, for Staudinger writes (*Hor. Soc. Ent. Ross.*, vii., p. 115): "*Fumea graecella, pulla* var.—My friend Millière is the author

of this doubtful species. Dr. Krüper caught it in great numbers from the beginning of March to the end of April on the Parnassus, but never sent me a case thereof, perhaps never found one himself, so that I was quite unable to send the case of this species to Millière which he none the less describes! His description from the Greek form states that the forewings are 'à pointe apicale prononcée,' whilst the apex of *pulla* is 'arrondié.' I do not attach much importance to this, as the wing-form of the same species varies, and also, if this were not so, every *Fumea* and *Psyche* known to me has in general a rounded apex. I only find that the Greek examples are somewhat more densely scaled, therefore of a deeper black than my specimens (of *pulla*) from Germany, France, Switzerland, and, in part, from Hungary and Castile. Fresh specimens from Castile are still darker, also somewhat smaller."

My first sight of this insect was a specimen from Greece, sent by Staudinger to Chapman, and I observed at once that it could not possibly be *Epichnopteryx pulla*. Chapman had already critically examined it and discovered that it had anterior tibial spurs, and, therefore, not only could not possibly be a form of *E. pulla*, but was referable to Rambur's genus *Psychidea*. An examination of the British Museum material showed a long series of large *pulla*, under the name of var. *graecella*, but mixed with them three examples from Greece, exactly like the one I had previously seen, and evidently belonging to *Psychidea*. In this series are two examples from Hyères, caught by Yerbury, and one of these (much rubbed) has a very pointed forewing. There can be no question I think that these two Hyères examples are not *graecella*, but I am at the same time not altogether satisfied that they are *E. pulla*. With all due deference to the opinion of such a great authority as Staudinger I would urge that Millière is quite right, that *graecella* has more pointed forewings than *pulla*, and that it is abundantly distinct. It is possible, though, that Millière's examples from south France were not identical with the Greek ones, that they were similar to the examples from Hyères in the Brit. Mus. collection, and that the case he describes as that of *graecella* is consequently that of a species abundantly distinct from that of which he describes the imago, very possibly not even congeneric. If the British Museum *graecella* are a fair sample of the insects in the various continental collections passing under this name, one is able to understand why most systematists make *graecella* a var. of *E. pulla*, as most of them are typical *E. pulla*: but there can be no doubt that the *graecella* from Greece sent out by Staudinger are an abundantly distinct species, and one is astounded at Staudinger doubting its specific distinctness. The anterior tibial spur is a character that will settle any doubt in a minute. One would like to see the life-history of the doubtful Hyères examples solved, we rather suspect them to be distinct from *E. pulla*, as they are apparently different from the examples of *E. pulla* obtained at Cannes, Alassio, and elsewhere on the Riviera in March and April.

The Guests of Ants and Termites.

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

(*Continued from p.* 75.)

Active mimicry, *i.e.*, the imitation of the host's movements, especially of its antennæ, can be added to passive, *i.e.*, the imitation of

the host's outward appearance. Both active and passive mimicry assist the genuine intercourse of the guest, as well as its simple toleration. The former is best exhibited by the Staphylinid genus *Atemeles*, which deserves the first prize for active mimicry, as they summon their hosts at feeding time in the same manner most generally employed by ants (see pl. fig. 1). They not only make use of their antennæ as do other true guests (*Claviger*, *Lomechusa*, *Amphotis*), but they also use their fore feet, which they lift up to stroke the feeding-ant on the side of the head, in the same way as does an ant asking for food. Active mimicry in many Brazilian *Eciton* guests probably assists them to be tolerated by their hosts. The shape of their antennæ for example, in *Ecitomorpha arachnoides* and *simulans*, is a sure sign of intercourse, although they do not possess the tufts of yellow hair, or any of the other characteristics of hospitable intercourse. In *Mimeciton pulex* it is doubtful whether the similarity of the antennæ has any connection with hospitable intercourse. Even in the genus *Myrmedonia*, which dwell with *Lasius fuliginosus* as hostile persecuted lodgers, I have often seen individuals stroke the ants with their antennæ, in their efforts to appease the latter.

The similarity of the outward appearance calculated to deceive the ant, even in the genuine guests, is only one of the means employed by them to make themselves pleasant to and taken care of by the ants. No passive mimicry is to be found in the whole family *Clavigeridae*, which belong, as has been already stated, to a higher form of Symphilie. They are always of that greasy shining red hue, sometimes darker, sometimes lighter, which is the most usual colour of true guests. It is of no consequence to them as far as their colour is concerned, whether they live with black or yellow ants. The peculiar shape of their bodies is also always the same in the whole group, and never imitates the shape of their hosts. Their guest patent is assured them by their aromatic charms, which give pleasure to their hosts' sense of taste. Even their active mimicry, *i.e.*, the imitation of the movements of the ants' antennæ, is much more imperfect than that of *Atemeles* and *Lomechusa*.

Lastly we mentioned among the adaptive characters of Myrmecophila and Termitophila a protected form which renders the guest unattackable by its host. This protected form is naturally only found in hostile and indifferently cared-for guests, so that as they are unattackable they are left in peace. Tropical American *Staphylinidae*, belonging to the genus *Xenocephalus*, are the best examples of this kind. They live in the company of the robber wander-ants (*Eciton*) and follow in their suite in the same way as the mimicking species of *Eciton* guests. Instead of deceiving their hosts with mimicry, they hide themselvs under a protecting roof, which is shaped like a shield and covers them completely with the exception of the ball-shaped pointed abdomen. It reaches to the ground, completely covering the head, antennæ, and legs of the beetle, which gives it somewhat the appearance of a mollusc-crab (*Limulus*), or of a pre-historic Trilobite. Dr. Joeldi once saw near Rio de Janeiro such a *Xenocephalus*, walking quietly and unmolested in the midst of a column of marching wander-ants. What makes them still more unattackable, their legs are quite flat and furnished with long spines, the head is pressed downwards under the thorax into a nearly pointed corner, so that the mouth comes between

the front legs; and the antennæ, which are quite flat and rudder-shaped, can be hidden in the cavity of the breast, so that they offer no weak point to the jaws of the ants. Even when a *Xenocephalus* is lying on its back it is not easy for the ants to attack it before it is on its legs again. Other *Eciton* guests of the genus *synodites* in the family *Histeridae*, being of a perfectly oval four-sided shape, are protected by this in the same manner as the *Xenocephalus* by its tortoise-shell form.

It may be mentioned that this oval shape, with the antennæ, and legs which can be drawn in, is common to the whole family of *Histeridae* whether they occur with ants or not. This, however, is not the case with *Xenocephalus* whose protective shield is specially provided to enable it to dwell with the hordes of wander-ants, as it is not found, at least in the same degree of perfection, in the allied non-myrmecophilous *Tachyporini*. We must, therefore, consider this shield to be an adaptive character. A new genus, *Ecitoxenus*, which was discovered by Father C. Heyer, S.J., with *Eciton coecum*, in Rio Grande do Sul, has been added to the already known genera of the *Xenocephalini*—*Xenocephalus*, Wasm., and *Cephaloplectus*, Sharp—and will soon be described.

The African genus *Cossyphodes* belonging to the family *Colydiidae*, show some splendid examples of the protected guests. The upper side forms a long elliptical arched disc, under which the real body of the beetle is hidden. The sides of the disc are slightly bent, and touch the ground. The head which forms the first part of the protecting disc is very peculiar, the eyes being marked on it like two small black warts. All the rest of the head lies on the underside and is furnished with its own gorge-plate. The antennæ can be wrapped up on each side under this plate. Dr. Brauns found lately *Cossyphodes bowicki*, Woll., in great numbers under stones in company with *Pheidole punctulata*, Moyr., at Port Elizabeth, in Cape Colony. He wrote to me about it as follows: "The insect was sitting in the midst under the ants and ran hurriedly about amongst them wherever the sun shone on the overturned stone. The ants paid no attention to it, and from time to time it ducked itself flat against the stone when it got too much mixed up with the crowd of ants. The protective shield is beautifully developed and its colour is the same as that of the ants."

It is not necessary, however, to go as far as Brazil to find good examples of protected guests, as in the Staphylinid genus *Dinarda* (see plate, fig. 2) we possess good examples. The broad flat thorax, the elytra, keel-shaped at the sides, and other peculiarities, insure their being at least tolerated, as they render them unattackable and invulnerable.

(*To be continued.*)

Notes on the Fumeids, with descriptions of new species and varieties (*with Plate*).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

(*Continued from p.* 62.)

In using the anterior tibial spur as a character for distinguishing the Fumeid species, it is necessary for accuracy to mount the tibia, take a camera sketch of it, and measure the tibia and spur, but if the forelegs are well extended such a sketch can often be taken without removing and mounting the limb, and to distinguish them, for most

practical purposes, a hand-lens is sufficient if the spurs be well visible in the specimen. It is very desirable that specimens should be set with this in view. I express the length of the spur more conveniently not by its own length, but by the percentage of the total length of the tibia that there is beyond the origin of the spur. The five principal lengths that occur are much more easily discriminated by eye after a little practice than their numerical difference would lead one to expect. The chief difficulty is between the *crassiorella* group, with a length of ·66 to ·74, and the *casta* group, ·77 to ·81, and here it would always be well to mount a specimen for examination.

Bruandia reticulatella.—The male of this species, as I have observed it in most collections, is almost identical with a specimen I have from Staudinger. It has 22 joints to the antennæ, and the anterior tibial spur arises at ·56 of the length of the tibia from its further extremity, giving the length of the spur on the assumption that the extremity of the spur reaches exactly the end of the tibia. The expanse is 13mm. The wing texture and general appearance approaches that of *Bijugis bombycella*, more flimsy and translucent than in other Fumeas. The costa is more rounded than in other Fumeas, that is the central portion, which is usually straighter than the basal or apical portion, or even quite straight, is either very short, or partakes of a continuous curve from base to apex. The colour is pale yellowish-brown, with a network of slightly darker brown (doubtless the darker portion was much more nearly black when the specimen was fresh). The darker markings follow the nervures longitudinally, and between the nervures they form transverse bands, usually not crossing the nervures, but alternating at them. The paler spots are fairly circular, or at least of equal transverse and longitudinal dimensions. The dark marks in the cell do not cross the median nervure, but alternate at it. From the cell to the fringe are, in each intercellular space, four pale patches, and one may count thirteen dark marks along the costa and ten along the inner margin, the two or three basal ones in each case being ill-marked. The hindwing is marked only by slightly darker nervures. I have bred, however, from Cannes, some specimens that agree absolutely with this specimen in the formula of the tibial spur, *viz.*, ·57 and ·56, in the greater transparency of the wings and in the roundness of the costa and apex. They vary in expanse from 9mm. to 16mm., are very dark in colour, and exhibit reticulation that can only be detected with difficulty. Although I am not aware that this variety of *reticulatella* has been described as such, I have very little doubt myself that that is its real character. The only doubt I have about it is whether it is the form described by Dr. Heylaerts as *norvegica* from the south of France. If so, it would be named *reticulatella* var. *norvegica*. If not, I should propose for it the name var. *obscurella* (pl. iv., fig. 27, ant. tibia of type form, figs. 28-29, ant. tibia of var. *obscurella*).

Bruandia comitella.—This species much resembles *B. reticulatella*. It has a more solid aspect than that species; the reticulations are more confined to the apical portion of the wing. The costa is rather straighter, and the usual tint is much darker. It is generally possible to distinguish several rows of pale spots parallel with the hind-margin and a darker shade occupying the distal margin of the cell. The most certain character by which to recognise it is the tibial spur length of

·61 and ·62 and the 20-jointed antennæ. I have bred one specimen of this from a Riviera larva, but have not recorded the precise locality (ant. tibia, pl. iv., fig. 30).

Masonia crassiorella.—I am not quite sure that I have not two species confounded under this name. It should be a large species, at least 16mm. in expanse, and those specimens that I regard as absolutely agreeing with the supposed type have 24 joints to the antennæ and a tibial spur formula of ·68-·70. This form I have taken at Cannes and have received from Staudinger. From another German source I have received specimens with 22 joints to the antennæ, and the British specimens I have seen (Mr. Digby's specimen and those in Dr. Mason's collection) agree in this. I have also specimens bred from Locarno larvæ with only 22 antennal joints and an expanse down to 12mm. All these have fairly uniform tibial spurs, varying from ·68-·70 British, from ·66-·69 the typical 24-jointed form, and ·69-·72 the Locarno form. I am unable to bring other characters into line with these variations, and the number of antennal joints does not vary in accord with the tibial spine. It is quite possible that my extreme measurements may be somewhat in error, and that ·67-·70 is the correct tibial formula for *crassiorella*. Certain specimens, however, of the Locarno form have a decidedly broader and shorter wing, slightly more rounded at the apex. In the absence of any distinct difference in spur length or antennal joints (22-23) I prefer for the present to leave them as an unnamed variety. I should define *M. crassiorella* as a large *Fumea*, 13mm.-16mm. in expanse, with 21-24 antennal joints, and an anterior tibial spur of ·66-·72, but this range of variation does not occur everywhere, some races being of 15mm.-16mm., and with 24 antennal joints invariably, others, as the English forms, never having 24 antennal joints, but ranging from 21-23 (pl. iv., figs. 31-34).

B. reticulatella and *B. comitella* have the "cellula intrusa," that is, the median nervure divides into two branches within the cell. *M. crassiorella* and all the other species I have examined are without it. Bruand describes (or at least figures) *M. crassiorella* as possessing it, and from an examination of a single specimen I agreed with him. Having, however, some doubt, I proceeded to make a further examination, and proceeded with specimen after specimen without finding it, which was only to be expected, since it does not possess it. I was, however, rather dissatisfied with myself at having for a time fallen into so serious an error, and at length I discovered the specimen I had first examined. It possesses the "cellula intrusa" well-developed on one side, very minute, if existing at all, on the other. It was having fallen by accident on this aberration that led me into my mistake. It shows that one should not be satisfied with examining one specimen, even when the result is to confirm a supposed well-established fact. Before I discovered the source of my error I thought I might have taken one of the *B. reticulatella* var. *obscurella* for an example of *M. crassiorella*. How did Bruand fall into the error—by mere carelessness, by mistaking *B. reticulatella* var. for *M. crassiorella*, by meeting with an aberration such as I did? I do not know, but, however much I may feel annoyed at being led into error so easily, I am clearly not in a position to find fault with him.

(? *Bruandia*) *rouasti* is an eastern species. The description does not show whether it is a true Fumeid or, perchance, a Proutiid. If a

Fumeid it belongs to the short-spurred group with "cellula intrusa" (*i.e.*, *reticulatella*, &c.). *Norvegica* is similarly conditioned. I have not seen specimens of either of these or of *raiblensis*.

(? *Bruandia*) *raiblensis*.—I have not met with any account of *B. raiblensis*, except the original description by Mann made from three specimens. The account he gives of it would lead one to suspect it to be a very large pale form of *B. reticulatella*. My Riviera specimens show that that species varies much in size and also in tint, and may very well have a large pale form as well as large and small dark ones.

(To be continued.)

Notes on Plate IV.

The figures are all from camera sketches. The neurations are not to a uniform scale of enlargement, but the well-known expanse of each species shows easily what this is. The tibiæ are enlarged 23 diameters, *i.e.*, figs. 19-49 ; 50 and 51 are only enlarged 8 diameters.

The neurations illustrate the great variability of this character in the *Psychides*, although this feature is, perhaps, less prominent in these lower divisions. Figs. 1 and 2 are the wings of one specimen of *Luffia lapidella*, nervure 3 present in one, absent in the other. Figs. 7 and 8, *Bacotia sepium:* 8 is fairly typical, 7, the other forewing from same specimen, shows the areolar cell nearly evanescent and a small branch present, probably representing nervure 10 (Meyrick's notation) ; similarly fig. 10 shows a nervure absent in fig. 9 (which is the more normal), thus illustrating a similar variability in the hind-wings of *B. sepium*. Figs. 13 and 15, *Prontia betulina* and *P. eppingella* (*salicolella* ?), the connate nervures figured in 15 often occur in *P. betulina* ; it is doubtful if the form of hind-margin shown in 15 is more than an individual variation.

The small figures against the tibiæ represent the percentage lengths of the tibia from the point of origin of the spine to end of tibia, taken as being the length of the spine. The lengths of the tibiæ vary with the sizes of the specimens, *e.g.*, fig. 37, *M. edwardsella*, and fig. 38, *M. hibernicella*, are approximately proportional to the sizes of the species. In figs. 24, 25, 26, on the other hand, *P. betulina* spur is much longer than that of *P. eppingella*, though the insects are only slightly different in size. In figs. 25 and 26 the different length of spur is individual, the French specimen having one short spur and one long one, like that figured from Epping. I am sorry to add that though the different thicknesses and curvatures of the various tibiæ are sometimes due to specific distinctions, they are more often due to the aspect they are viewed in and their method of preparation and mounting ; but I must add that I am rarely able to say which element is most potent in any individual case. I think, however, that figs. 43 and 45 probably have really the same form of tibia. Again, fig. 39 is obviously viewed more from below. English *M. crassiorella* are not so abundant as to enable one to say anything as to why fig. 31 shows such a curvature, but it is probably due to an individual variation or twist in setting, or some non-essential cause.

What these sketches show is the relative signs of tibiæ in different species, and especially the point in the length of the tibia from which the spur arises. In this respect the figures may be relied on. The calculated percentages are probably correct to two, or at most three, points, the chief source of error here being the difficulty of always

being sure of calculating from the same points at the ends of the tibia, these being irregular for articulating purposes, and not always so in precisely the same details, or always seen in precisely the same aspect, and in many cases not separated from the corresponding articulating surfaces of the femur and tarsi respectively. Some obscurity is often added by the clothing of hairs and scales. The percentage of error is, however, small. Thus I should not suppose any *M. crassiorella* would have a length of less than ·65 or more than ·61, or that *F. casta* goes below ·77 or above ·81, and any measurements outside these are probably due to errors of observation. I have examined a very large number of these two species. I know of no reason to suspect greater variability in species where I have been able to examine only very few specimens.

Digne Revisited.

By H. ROWLAND BROWN, M.A., F.E.S.

(*Concluded from p.* 59.)

Thais, in fact, was over for me, and although I kept a wary eye on all occasions, only three belated females, the last on June 9th, fell to my bag. Of the little louse-like larva already to be found upon the *Aristolochia*, my companions collected a fair number, and, judging from the hundred or so I noticed feeding in the cupboard of the naturalist aforesaid on absolutely withered pabulum, I should think it was easy enough to rear. On the slopes of La Collette, beside the Theclids already mentioned, *Limenitis camilla*, *Coenonympha arcania*, *Syrichthus sao*, and *Spilothyrus lavaterae* also turned up, the latter in some profusion, though it was hard to get perfect specimens on the wing, and the frantic evolutions attempted in the pill-boxes only made matters worse. *Cupido sebrus* also occurred here, but its chief headquarters are in the torrent bed of the Eaux-Chauds, where it literally swarmed, with not a few *Nomiades cyllarus*, somewhat knocked about, and the males of *Polyommatus escheri*. Of the last-named we had a perfect feast of beauty one day at this spot. A stream comes trickling down from the higher slopes among a maze of hazel, privet, and clematis, breaking up over the saxifrage-fringed bank into the main river, and dividing among little islets of rich black mud. Upon them, when the sun was out, the number of Lycænids sucking in the moisture was legion. The male *P. escheri* in particular made a brave show, with herds of *P. bellargus*, *C. sebrus*, *N. acis*, *P. icarus*, and *C. minima*. The females, however, were more coy, and the few either taken or seen were distributed over the grassy trefoil-covered banks, where also *Lycaena arion* most abounded. About the privet blossoms—scanned by me in vain for *Laesopis roboris*—*Melitaea deione* flitted in confusing company with *M. phoebe*, which it so nearly resembles, though it may be distinguished here, at any rate, by the lighter coloration and inferior size of its wings. In the woods, carpeted with luscious strawberries, *Pararge egeria* ab. *intermedia*, *P. megaera*, *Nemeobius lucina*, and the ubiquitous *M. athalia* gleamed in and out of the shady walks, while the margin of uncultivated land, gemmed with the blue salvia, clover, hawkweed, and a fine red gladiolus, swarmed with *Aporia crataegi*, *Brenthis dia*, and *B. euphrosyne*. An occasional *Pyrameis cardui*, worn to rags, would dash suddenly across the line of sight, and

the Hesperids, from *Pamphila sylvanus* to *Thymelicus actaeon*, were everywhere, though the favourite attraction for this, as for other species, was certainly a tall umbelliferous flower, the usual, but by no means invariable, food-plant of *Papilio alexanor*. Sometimes we would go farther afield on cycles—the Digne cycle is a caution—up the valley of the Bléone, where on June 7th I still found *Euchlöe euphenoides*, the female as well as the male, on the wing, with *Lycaena arion* and *Polyommatus hylas*, but *Everes argiades* var. *coretas* was practically over, judging from the one broken example I netted, and *L. iolas* as well. On June 12th a German collector, Mr. Kollmorgen, took *L. arcas*, but I never came across it myself, and the next day *L. meleager*, in all its first splendour was brought to account, together with a remarkable male *P. corydon*, in which hardly any trace of the black margins appeared, seemingly a connecting link between the type and the var. *albicans* of Spain. But the commonest of all insects was *Melanargia galathea* var. *procida*, high and low, wood and hillside, it occupied every acre of the land. Then *Argynnis daphne* put in a welcome appearance by the Baths, where also I had observed *Cyaniris argiolus* flying over the clematis. *S.* var. *serratulae*, and one or two *Spilothyrus althaeae* further east swelled the number of the skippers, and on the walls outside the town *Polyommatus eyca* tempted frequent incursions into the vineyards and potato fields. Higher up *Argynnis adippe*, a monster representative, with occasional var. *cleodora*, afforded endless opportunities of steeplechasing, and hardly less active on the wing was *A. niobe*. But, curiously enough, it was only on the last day of my visit that I took the two insects for which I had hitherto looked in vain. I had heard that one of the first places in which *Papilio alexanor* might be looked for was the valley above the bath establishment. Thither on the 18th I accordingly betook myself, and no sooner had I snapped up a couple of males of *Coenonympha dorus* from the damp footpath, than I saw the glorious Digne swallow-tail almost at my feet on a hawkweed flower. It was the only one I secured, but after leaving I heard from Miss Fountaine that it became more or less general as the time went on, and that *C. dorus* was as common as *C. arcania*. My informant has also been good enough to give me further information with regard to *P. alexanor* and one or two other of the rarer insects which this year did not appear on the wing until late in June or during July, and I cannot do better than conclude with some quotations from her list:—*Papilio alexanor*: one specimen every day in whatever locality visited; on July 12th eight, and later, with another net, 32, in the locality where I first took it. *Parnassius apollo*: a very large form on La Collette, towards the end of June; a little later on Les Dourbes, but not quite so fine. *P. mnemosyne*: also on Les Dourbes a little earlier. *Laesopis roboris*: in four distinct localities, but always sparingly and very difficult to get fresh; it occurred above Villard at close upon 3300ft., and was first captured on June 27th. *Polyommatus escheri*: the females became quite common later in the month. *P. admetus* var. *rippertii*: not common this year except on a spot about half way up the Coussons (3500ft.); first observed July 5th. *Apatura ilia* var. *clytie*: one only, taken by Mr. Kollmorgen in the streets of Digne, end of June. *Erebia stygne*: very common on the Coussons and Les Dourbes; first taken July 5th. *Satyrus fidia*: in several localities, but never common, and hard to catch; first seen

about the middle of July. *S. cordula*: common everywhere throughout July. *S. actaea*: later than the preceding species and much rarer. *Epinephele lycaon*: fairly common in the gorges; females not before July 28th. Miss Fountaine also remarks that though she tramped the Dourbes for twelve hours on July 23rd she was unable to discover *Erebia scipio*, though two days earlier two specimens were secured by a local entomologist, who said it had become much scarcer than it used to be.

Notes on Orthoptera in the Siamese Malay States.

By N. ANNANDALE, B.A.

(*Concluded from* p. 77.)

Among the dry stubble of the rice-swamps in the Siamese States, a large green and yellow *Acridium* is common, passing in Jalor and Rhaman under the name of "Pig Belalang." At first I was puzzled by what appeared to be a huge pink grasshopper, which was always found in company with this species, and which was never seen except on the wing. In reality the two forms were one; the wings of the *Acridium* are shaded with pink at their base, and when they are in rapid motion this colour seems to suffuse itself over the whole body, so that it alone appears when the insect is flying. The small *Eumastacidae* which are found among the "lalang" in Kelantan, are even more brilliantly coloured, some of them bearing no small likeness to wasps or scorpion-flies, with their contrasts of black and yellow, and their peculiarly shaped wings. Others, which are found leaping on the jungle floor, are hidden among the dead leaves by their mottled brown coloration. But one of the best concealed of all the *Acridiodea* is a Tettigid, that is common on logs of wood floating in the Kelantan river. Its immensely extended pronotum completely covers the wings when they are not in use, and, being coloured of a dark green, speckled with black, exactly harmonises with the damp bark on the logs. This insect has three manners of escape when disturbed; it may dive into the water, as it often does; it may take to flight; or if the log is near the bank, it may leap ashore. It is not able to stay below the surface for so long a period as the cockroach found in the same position; but its flight, though never prolonged, is very swift for that of an Orthopteron, somewhat resembling the flight of a large fly, and its saltatory powers have not been diminished by its curious manner of life.

The small *Locustodea* that are found in the clearings call for no special comment from me. Their habits cannot be uninteresting, but they are not to be observed on such a hasty expedition as ours. The larger, jungle-haunting members of the family, though most of them are rare, are so conspicuous that they force themselves upon one's notice. Once I remember coming across four females of one of the largest and most beautiful of the Malay *Pseudophyllidae*—a magnificent pale yellow-green form, nearly six inches in length, whose tegmina were spotted with "eyes" of two shades of blue, whose legs were plum-coloured, and whose cheeks were painted with the same bright shade—seated together on a single bush in very deep jungle. On our approach, they all flew off, each in a different direction; and three of them escaped. Their first flight was low and feeble, but each time that they alighted, they seemed to gain fresh strength from the

momentary rest, and they soon disappeared among the upper foliage. Compared with such an insect, the most gorgeous butterflies of the tropics seem tawdry and commonplace. *Macrosiphus sumatranus*, Haar, a locust with which one sometimes meets in the Malay jungle, is hardly less brilliantly coloured, if it is considerably smaller, for its tegmina are black, spotted with gold, its head of the clearest scarlet, its femora black, and its tibiæ white. The beauty of such specimens soon fades, however they may be preserved; in spirit or formaline it vanishes entirely. A much commoner species than either of these is *Mecopoda elongata*, which the Malays call the Deer Grasshopper, because of the splendid way in which it leaps along among the bushes at the edge of the jungle. Its colour varieties are almost as numerous as those of the eggs of the guillemot. Some specimens are green, others are brown; some are all of one shade, others are marked with spots and patches that look as if they had been laid on with a brush, and the extreme varieties, green and brown, are found together, sometimes both on one bush. The two tegmina of a single specimen often do not exactly correspond with one another in their markings. For some good reason, the Malays compare the harsh and grating stridulation of this species to the crowing of a cock. They keep it alive in cages, feeding it on the young shoots of the pine-apple plant, in order to listen to its song. To a European ear the sound is as unbeautiful as Chinese music, and it is not made more melodious by the fact that it only commences at the dead of night. A most remarkable form is not uncommon, which, coloured in neutral shades of green and brown, has the power of erecting a scarlet bladder between the head and the thorax, if it be roughly handled. I have already referred to the *Stenopelmatidae* of the Jalor caves. Specimens of the cave species are only found in absolute darkness, and, though they have eyes well supplied with pigment, are probably blind. The further that one penetrates into the caves the more numerous do individuals of this Locustid become, until, at half a mile from the entrance, the ground is alive with them, jumping like sand-hoppers on the sea-shore, and the walls covered wherever there is any kind of recess. They do not appear to sit on a rock which is quite straight and vertical, but prefer to shelter under a overhanging ledge, probably because water is continually dripping from the roof in many parts of the cave. Several other species belonging to this interesting family are found in Lower Siam, under the bark of dead trees and in the deserted galleries left by termites in wood. A curious point with regard to the structure of the cave form is that one antenna, usually the right one, is very considerably longer, and quite perceptibly stouter than the other. This asymmetry is probably correlated with a certain difference of function between the two. While the insect is resting, there is certainly a tendency for the shorter antenna to be held bent over the back while the longer one is moved round through the greater part of a circle. I was unable to detect anything else in the position which the Stenopelmatid assumed in the caves, which tended to throw light upon this curious phenomenon. The asymmetry is even more noticeable in a single specimen of a considerably larger species which I found in a dead tree in the jungle.

I have left myself no room to speak about the *Mantodea* and the *Phasmodea*, which are in some ways the most interesting groups of the Orthoptera, but perhaps this is just as well, for they need a far more

detailed treatment than would be possible in the present paper. Let me only notice that marvellously beautiful Mantis, *Hymenopus bicornis*, a pupa of which lived for some days in my charge. In form and colour it was so perfectly assimilated to a flower, that I was completely deceived as to its real nature when I saw it first, and, even when I held the inflorescence on which it had taken up its station in my hand, I could not be certain exactly where the insect ended and the flowers began. The very flies are deceived by the likeness, and small Diptera do not hesitate to settle on the body of the mantis, which takes no trouble to catch such insignificant prey, but waits until larger flies come within its grasp.

On the British Orthoptera in the Hope Museum, Oxford.

By MALCOLM BURR, F.Z.S., F.E.S.

In the Hope collection, in the University Museum, at Oxford, there are a number of old specimens of considerable interest, as many are labelled in the handwriting of the late Professor Westwood, and some in the handwriting of Stephens. Professor Poulton has been kind enough to permit me to examine and rearrange them. The following notes on some of the older specimens may be of interest.

Forficularia.—*Labidura riparia*, Pall.—One ♂, two ♀. "England." No further information on the labels. They are very probably some of the original specimens taken near Christchurch. *Anisolabis maritima*, Bon.—"Northumberland. G. Wailes. 1857, end of September." These are evidently not some of the original examples taken by Bold at South Shields, but those captured a few years later by George Wailes, when he took a number of specimens for his careful observations of the development of the antennæ and abdominal segments, recorded by him in the *Zoologist*, vol. xvi., p. 5895, in a paper that has to a large extent been overlooked, in spite of its great interest. The insect was taken in heaps of ballast emptied by ships returning from abroad, and it is practically certain that it was an importation. It was first captured in 1856, and was still to be found in 1860. It is unknown whether the species still exists there. *Labia minor*, L.—Six ♂, ten ♀. "Snowdon." *Forficula auricularia*, L.—Numerous examples. Two are labelled "*borealis*" in what I believe to be Stephens' handwriting; these are what I have always regarded as the variety *forcipata*. The difference between the two is merely a matter of the comparative length of the forceps. *F. lesnei*, Fin.—One ♀. "Kingstone," an old specimen. *Apterygida albipennis*, Meg.—One pair, old, and in bad condition. There is no locality attached, but the specimens are probably some of the originals taken at Ashford by Westwood. In his handwriting they are labelled "*F. centralis*, Westw., MS."

Blattodea.—*Ectobia lapponica*, L.—Ten ♂. "Sunning Hill, Berks." *E. livida*, Fabr.—"Rudd. N. F." This species has been previously recorded from the New Forest. *E. panzeri*, Steph.—Several examples. Two males labelled "J. C. Dale, 1865." One specimen, a male, is labelled "*Blatta nigripes*, Mus. Steph., in *Notes on habits*, B. G. C.," but it is too pale in colour to be the true form *nigripes*, and does not agree with Stephens' own description. It is the ordinary typical form. There are several specimens considerably darker in

colour, approaching more nearly to the true *nigripes*. One dark specimen is labelled "Rev. W. Kirby, *lapponica*." There is one ♀ with ootheca labelled "Black Gang Chine." *Phyllodromia germanica*, L.—This species is usually considered to have been introduced into England by the soldiers returning from the Crimea, but we have distinct evidence here that it was numerous in parts of England before that date. There are several old specimens, one of which is labelled "Infesting the kitchens of houses at Kildare, Ireland, living behind the skirting and abounding in the crevices of the kitchen table, destroying all kinds of paper and in many ways very troublesome, March 1852," and there is another specimen labelled in the same handwriting, "Mr. Gray Dudley; taken by him in his garden at the foot of Castle Hill." Reports of this species taken out of doors are rare. It occurs in a wild state in woods in Prussia and Russia, so there is no reason why it should not become settled wild in this country, as it has become firmly established in a domesticated condition. *Blatta orientalis*, L.—Several specimens unlabelled; one ♀ nymph "under bark of tree, 10ft. up, K. G." (?=Kew Gardens). It is rarely that this species is taken out of doors, for it seldom leaves the warm kitchens and hot corners that it loves. It would probably be unable to exist in the natural state in this country. There is one crushed and mutilated nymph, mounted on card with the label "Larva of a *Blatta*, sent by Mr. Backhouse from Gateshead, as a flea, and exhibited by J. O. W. at Ent. Soc. as *Pulex imperator*." This is the original type of Westwood's famous mistake. He exhibited this specimen at the Entomological Society (*Proc. Ent. Soc.*, 2nd series, iv., p. 70) in 1857, as a new species of flea, twenty times the size of the largest flea hitherto known! He corrected his mistake in the following year (*op. cit.*, v., p. 60). There is also a broken ootheca with the label "Egg-pouch of *B. orientalis?* Mr. W. Baird in acct. amongst ent. scraps. For the parasitic *Chalcididae* bred see them among *Chalcididae*." I have carefully searched through the drawers of the British *Chalcididae* and have been through Walker's *Monographia Chalciditum* but cannot find the specimens referred to.

Acridiodea.—*Mecostethus grossus*, L.—Five ♂ and three ♀. Without locality, labelled "*Locusta flavipes*." *Stenobothrus lineatus*, *S. viridulus*, *S. rufipes*.—Several specimens with no interesting labels. *S. bicolor*, Charp.—Many specimens without labels. One ♂ labelled "*cruciyera*," and another ♂ "Isle of Purbeck, 1830. *L. rubicunda*." This is apparently the pink form known as *purpurascens*, Fieb. The name *rubicunda* has usually been referred to *S. viridulus*, of which a reddish form is sometimes taken. *S. parallelus*, Zett.—Several nymphs, and one empty nymph-skin, "Blenheim Park, 1832." *Gomphocerus sibiricus*, L.—One ♂ unlabelled, which is most probably Stephens' type, said to have been taken at Netley. *G. rufus*, L.—One ♂ unlabelled. *G. maculatus*, Thunb.—One ♂ "Devil's Ditch, Newmarket Heath, July 2nd, 1833. J. C. Dale." *Pachytylus migratorius*, L.—There are four specimens of undoubted *migratorius*, showing that this species has really occurred so far west as this country. One male is unlabelled, another "Littlehampton, Sussex, 1846, J. O. W." One ♀ "alive near Oxford, J. O. W." and a second ♀ "Ct. alive near Chepstow, September 16th, 1857." [There are no specimens of *P. danicus*, L.]. *Schistocerca peregrina*, Oliv.—Two specimens, one labelled

"F. Bond, Esq., near Falmouth, a number of specimens near Plymouth," the other "Cornwall, F. Bond, Esq., 1870." A good many examples of this locust were taken in Britain in 1869, but I do not think any have been recorded for the following year. *Tettix subulatus*, L.—"Cambridge." Some are labelled "*bipunctatus*." *T. bipunctatus*, L.—About 30 specimens without labels.

Locustodea.—*Leptophyes punctatissima*, Bosc.—A number of unlabelled specimens. One female "caught October 1st, Coombe 1806, *clypeata*, Pz., Mr. Neale." One ♂, two ♀, "Miss Badcock, on a pear tree," another "*Ephippigera virescens*, Steph., *Ill.*, vi., 16, viii., 33." *Ephippigera virescens*, Steph., is known to be a synonym for *L. punctatissima*, but "*clypeata*, Panz.," is usually regarded as a synonym of *Thamnotrizon cinereus*, L. *Meconema varium*, Fabr.—One male "Sept. 16th, 1833, Foxley Wood, Norfolk," another "Taken in second week in November, '66, Mr. Briggs, St. John's Coll." This species is one of our latest Orthoptera, and may be taken well into the winter. One female, "Miss Badcock, on a pear tree." *Xiphidium dorsale*, Latr. —One male labelled "*Acrida fusca*," and a male "Norfolk, August 1st, *A. fusca*, Pz.," also four ♂, seven ♀ and two nymphs, all labelled "*fuscum*." Stephens obviously confused *X. dorsale* with *X. fuscum*, a very distinct species, which is far more common and widely distributed on the continent than *X. dorsale*. *Locusta viridissima*, L.—One male "Parks, Oxford, 1848;" several unlabelled specimens. *Thamnotrizon cinereus*, L.—One male "*D. apterus*," one ♀ "near Croydon," one ♀ "*ephippiger*" and four ♂ and four ♀ unlabelled. *Platycleis grisea*, Fabr.—Several specimens without labels, one nymph queried "*viridissima*, ex Museo D. Hill." *P. brachyptera*, L.—One ♂ labelled "*brachyptera*" and one "*kirbii*" also a male labelled "*clypeatus*" and several nymphs "*kirbii*." *Decticus verrucivorus*, L.—A male "*bingleii*, Rev. D. Bingley," probably one of Curtis' types, but of the green form, also one female "*verrucivorus*."

Gryllodea.—*Nemobius sylvestris*, Fabr.—Several specimens of both sexes, unlabelled. *Gryllus campestris*, L.—One male "Weaver, N. F." and several specimens without labels, including one of the very rare variety with fully developed wings, projecting well beyond the elytra. [There is also a specimen with wings projecting far beyond the apex of the abdomen, which I refer with some doubt to *G. bimaculatus*, de Geer, a meridional species. It may be an extreme form of *G. campestris*, or may have been accidentally introduced.] *G. domesticus*, several examples, unlabelled. *Gryllotalpa gryllotalpa*, L.—Five ♂, four ♀, unlabelled.

COLEOPTERA.

Coleoptera in Cumberland in 1899.—The species enumerated below were taken during the past season, and, without exception, are additions to the lists published by us in the *Ent. Record*, vol. x., p. 126, and vol. xi., p. 103. *Notiophilus palustris*, locally common under stones. *Dyschirius nitidus*, sparingly in burrows of *Bledius spectabilis*, at the Estuary of the Eden. *Bradycellus placidus*, rather abundant, but local, at roots of grass, and in moss. *Dichirotrichus pubescens*, on the beach, at Silloth, rare. *Pterostichus aethiops*, under stones in the Pennines, scarce. *Amara consularis*, one specimen. *A. similata*, a few in flood refuse. *A. acuminata*, one on a pathway. *Calathus fuscus*,

scarce on the coast. *C. micropterus*, locally common under stones in the Pennines. *Bembidium obtusum*, at roots of grass, &c., rather common. *B. schüppeli*, moderately common on the banks of the Irthing (*vide, Ent. Mo. Mag.*, vol. xxxv., p. 205, and *Naturalist*, 1899, p. 288). *B. femoratum*, locally common on the banks of the Eden, near Salkeld. *Tachyporus flavipes*, scarce by the Irthing. *Patrobus assimilis*, moderately common in the Pennines. *Cymindis vaporariorum*, sparingly among the same mountains. *Lebia crux-minor*, one specimen (*vide, Ent. Mo. Mag.*, vol. xxxv., p. 145). *Dromius nigriventris*, one on the banks or Eden near Salkeld. *Coelambus parallelogrammus*, one or two in a boggy pond. *Hydroporus tristis, umbrosus*, and *obscurus*, moderately common. *H. planus*, one only, but probably common. *H. morio*, a few in a mossy pool about 2000ft. up in the Pennines. In this pool a reddish form of *H. pubescens* occurred with the type. *H. erythrocephalus*, very common. *Agabus unguicularis*, a few in a boggy pond. *A. sturmii*, very common. *A. chalconatus*, in fair numbers, some very small. *Ilybius guttiger*, one specimen. *Rhantus exoletus*, one specimen. *R. pulverosus*, a few taken. *Acilius sulcatus*, locally common. *Gyrinus natator*, common. *Orectochilus villosus*, under stones by the Irthing. *Philydrus minutus*, sparingly. *Helochares punctatus*, common. *Laccobius sinuatus*, and *Hydraena riparia*, sparingly. *Sphaeridium bipustulatum*, a few in dung. *Cercyon lateralis*, very common in putrid fungi. *C. obsoletus*, one in dung. *C. pygmaeus*, and *C. analis*, in flood refuse. *Homalota currax*, sides of streams. *H. elongatula, linearis, circellaris, analis, fungi*, and *longicornis*, in flood refuse. *H. graminicola*, at roots of grass. *H. immersa*, under fir bark. *H. xanthoptera*, common in fungi. *H. sordida*, and *trinotata*, under haystacks. *H. atramentaria*, in dung, &c. *Gnypeta labilis*, in flood refuse. *Leptusa fumida*, and *Bolitochara obliqua*, under fir bark. *Oligota inflata*, among hay. *Myllaena brevicornis*, at roots of grass. *Gymnusa brevicollis*, in grass tufts. *Tachinus humeralis*, common in putrid fungi. *Boletobius exoletus*, in fungi. *Mycetoporus lepidus, clavicornis*, and *splendidus*, sparingly in moss. *Quedius lateralis*, rather common in fungi in autumn. *Q. nigriceps*, scarce under stones in the Pennines. *Leistotrophus murinus*, one in a decayed turnip. *Philonthus marginatus*, common in dung, carrion, &c. *P. puellus*, several in fungi. *Lathrobium atripalpe*, two specimens under stones in the Pennines, and Mr. G. B. Routledge secured a third. Mr. W. E. Sharp's record (*Ent. Rec.*, vol. x., p. 272) from North Wales, is the only previous one south of the Scotch border. *Cryptobium fracticorne*, not scarce in moss. *Stilicus rufipes*, under haystack. *Stenus flavipes, pallitarsis*, and *nitidiusculus*, by sweeping. *Bledius spectabilis*, common on mud banks on the Solway. *Oxytelus maritimus*, under refuse on the beach at Silloth. *O. nitidulus*, and *tetracarinatus*, by sweeping. *O. sculpturatus*, in flood refuse. *Anthophagus testaceus*, one swept. *Acidota crenata*, in moss, scarce. *Lathrimaeum atrocephalum*, in polypori. *Omalium pusillum*, under fir bark. *O. excavatum*, and *striatum*, in flood refuse. *Megarthrus denticollis*, and *affinis*, in putrid fungi. *Phloeobium clypeatum*, at roots of grass, and in fungi. *Pselaphus heisei, Tychus niger, Bythinus validus, Bryaxis juncorum, Eucnnus limetarius*, and *Scydmaenus collaris*, in sphagnum. *Liodes humeralis*, under bark, scarce. *Silpha tristis*, in flood refuse, &c., scarce. *S. opaca*, among refuse in pine plantations, uncommon. *Choleva wilkini*, by

sweeping and in fungi. *C. longula*, one in flood refuse by the Irthing. *C. morio*, in flood refuse, and at roots of grass. *C. chrysomeloides*, one specimen. *C. grandicollis*, in carrion. *C. fumata*, in fungi, scarce. *Hister unicolor*, in putrid fungi. *H. neglectus*, and *carbonarius*, in dung. *Gnathoncus nannetensis*, one specimen. *Saprinus aeneus*, and *maritimus*, under shore refuse at Silloth. *Onthophilus striatus*, very common in dung, &c. *Adalia obliterata*, in fir plantations. *Halyzia* 16-*guttata*, one on the wing. *Scymnus nigrinus*, sparingly in moss. *Soronia grisea*, under bark. *Omosita depressa*, in fungi. *Meligethes lumbaris*, by sweeping. *Ips* 4-*punctata*, in fungi. *Rhizophagus dispar*, under fir bark. *Lathridius lardarius*, and *Melanopthalma fuscula*, in newly cut hay. *Antherophagus nigricornis*, one specimen. *Atomaria fuscata*, *pusilla*, and *analis*, in newly cut hay, &c. *Ephistemus gyrinoides*, among haystack refuse. *Typhaea fumata*, and *Dermestes lardarius*, by sweeping. *Attagenus pellio*, in houses. *Simplocaria semistriata*, in flood refuse. *Parnus prolifericornis*, sides of ponds, &c. *Aphodius erraticus*, and *luridus*, in dung. *A. conspurcatus*, in flood refuse. *Egialia sabuleti*, one by the Irthing. *Geotrupes typhaeus*, rather common near Salkeld, this is probably the most northern locality from which it has as yet been recorded. *Sericosomus brunneus*, one taken on the wing. *Telephorus figuratus*, very common on the wing in some meadows fringing a wood. *Rhagonycha limbata*, common everywhere. *Hydrocyphon deflexicollis*, sparingly by the Irthing. *Eruobius mollis*, in a flour mill. *Cis nitidus*, and *Octotemnus glabriculus*, in polypori. *Leiopus nebulosus*, beaten from oak. *Saperda populnea*, very common among aspen; never recorded from so far north before (*vide*, *Science Gossip*, 1899, p. 91). *Cryptocephalus fulvus*, by sweeping. *Phytodecta olivacea* var. *nigricans*, one from broom. *Lochmaea capraea*, beaten from various bushes. *Galerucella calmariensis*, by evening sweeping. *Longitarsus atricillus*, by sweeping. *L. jacobaeae*, from ragwort. *Crepidodera rufipes*, one specimen near Salkeld. *Psylliodes marcida*, on the Solway sandhills. *Cassida hemisphaerica*, one, from bilberry. *Microzoum tibiale*, on the Solway sandhills. *Tribolium ferrugineum*, in a flour mill. *Rhinosimus ruficollis*, and *viridipennis*, under bark, and by sweeping. *Pyrochroa serraticornis*, several on the wing. *Anaspis fasciata*, from hawthorn. *Anthicus scoticus*, in small numbers by the gravelly side of a stream near Allonby, on the coast. This is where Mr. Routledge took the specimen recorded in the *Ent. Record*, vol. x., p. 86, and is, at present, the only known English locality. *Rhynchites minutus*, from birch, &c. *Apion ricinae*, *assimile*, *punctigerum*, *aethiops*, and *ebeninum*, by general sweeping. *A. carduorum*, common on thistles. *Otiorrhynchus oratus*, on the sandhills at Silloth. *Exomias araneiformis*, this species was intended last year, when *Barypeithes sulcifrons* (which has not yet been found) was recorded. *Brachysomus echinatus*, one swept. *Polydrusus tereticollis*, *Phyllobius viridicollis*, and *P. viridiaeris*, by sweeping. *Tanymecus palliatus*, one on Burgh marsh. *Sitones cambricus*, and *punctivollis*, by sweeping. *Hypera suspiciosa*, by sweeping. *H. trilineata*, in newly cut hay. *Dorytomus pectoralis*, beaten from birch. *Cryptorrhynchus lapathi*, common on osiers by the Eden. *Coeliodes rubicundus*, from birch, &c. *Ceuthorrhynchus assimilis*, and *quadridens*, by sweeping. *C. euphorbiae*, one swept. *Rhinoncus pericarpius*, and *Limnobaris t-album*, by sweeping. *Scolytus destructor*, under bark. *Hylastes ater*, in fir wood.—F. H. Day and James Murray, Carlisle. *March 8th*, 1900.

NOTES ON COLLECTING, Etc.

Lepidoptera captured in 1899.—During a very busy year I was only able to get a few afternoons and evenings at my favourite pursuit, but as these proved fairly successful, the result may perhaps be interesting to those London collectors, whose outings, like my own, are limited to occasional half-holidays and evenings. A North Londoner is severely handicapped by the early hour at which the G. N. Ry. Co. runs its last train home. All the best localities lie south of the Thames, and the late trains from these places arrive just after the last G. N. starts home for Highgate. Thus from Chattenden, I have to catch the 9.20 from Cliffe, instead of the 10.39 from Higham, cutting off the best part of the evening, and similarly from other places. Mill Hill: I generally run down to Mill Hill early in the summer, to see how things are getting on, and on June 1st, paid my usual visit for a couple of hours at midday. I found *Thanaos tages*, *Syrichthus malvae*, and *Enchloë cardamines* well out, and *Heliodes arbuti* very plentiful; a fortnight later *Adscita statices*, *Tanagra chaerophyllata*, *Emmelesia albulata*, and *Timandra amataria*, always occur abundantly and generally a few *Anthrocera trifolii*, *Emmelesia decolorata* and *Asthena luteata*. The railway (G.N.) cutting towards Edgeware is perhaps the best collecting ground, until you are turned off, and then the neighbouring meadows. Here you are also liable to disturbance, but the diplomatic offer of a "drink" is all sufficient. Chingford: The following evening I went to Chingford, after *Zephyrus betulae*, and beat a few larvæ from a favourite corner, where it usually occurs. In this corner also *Ligdia adustata* is always common, and was so upon this evening, but I have never come across it elsewhere in the forest; *Ephyra trilinearia* was very plentiful, and many commoner things. Chattenden: On June 9th, I managed to work in a whole day, and spent it at Chattenden. I was delighted to find *Scoria dealbata* still holding its own well. There were some numbers of them, and I could have taken a long series had I been so disposed, but contented myself with selecting a few specially large males—all were very large in fact. *Lithosia aurcola* was also fairly common, and among dayfliers—*Callophrys rubi*, *Cyaniris argiolus* and *Macroglossa fuciformis* occurred. *Aspilates strigillaria* was walked up, and great quantities of *Corycia taminata* beaten out, with *C. temerata*, *Ephyra omicronaria*, *Asthena luteata*, and *Erastria fuscula* less commonly, but yet in sufficient numbers, and a single very fine *Platypteryx hamula*. Altogether a pleasant day, with something useful at every turn. At my next visit, on July 11th, however, the place had a very different aspect, and only two species beyond the very commonest occurred in any numbers. One of these was *Calligenia miniata*, which was very common in its characteristic way, half-a-dozen or so within two or three yards, and then no more at all, until the next colony was reached; I came across a number of these little colonies, and could have taken a long series. *Thecla w-album*, the other species referred to, was local, but abundant where found; in fact, on one fair-sized privet bush, I counted nine specimens at once, and they also frequented the bramble-blossoms. Later in the day, they showed a marked predilection for the small ash trees, and a fair number was shaken out of these after sunset. Besides these species a few *Zephyrus quercus* and *Melanargia galatea* occurred, and

Angerona prunaria was not uncommon at dusk; an odd *Mylophila cribrum* was found at rest on a thistle, and single *Crambus pinellus* and *Asthena luteata* were beaten, but nothing else of note. I had in connection with this day a curious experience. A specimen of *Phorodesma bajularia*, faded to a pale salmon colour, which I boxed for ova, was accidentally put in the ammonia over night, and in the morning, I found the colour restored to a brilliant green. As the effect of the fumes went off it quickly faded again, but was immediately restored upon holding it over the ammonia bottle, and again fading in a few seconds when removed. The effect was quite as rapid as that produced by ammonia upon red litmus paper. I have always noticed that the colour of this species is quite uninjured by ammonia, but I have never before heard of a case of its being restored. Oxshott: Two other very successful evenings, spent at Oxshott, on each occasion only having from 6 p.m. to 9.25 p.m. between arrival and departure. On the first occasion (June 27th), I spent half the time amongst the pines and heather, getting a fine lot of female *Bupalus piniaria*, plenty of *Macaria liturata*, five *Eupithecia indigata*, two *Acidalia subsericeata*, a single *Diorygtria abietella*, and plenty of *Pempelia palumbella*. Then working through a small copse, and into a grassy glade through a clump of birch trees, quite a different lot of species occurred. Here *Lomaspilis marginata* simply swarmed, but I noticed no decent vars. A fine *Eucosmia undulata* was the best capture, and besides this a couple of *Melanthia albicillata*, three *Platypteryx falcula*, three *Eupisteria heparata* and a finely coloured *Erastria fuscula* were beaten. Amongst the *B. piniaria* taken is a very curious specimen. It is coloured as a female, with the exception of one small patch of male colouring, but the antennæ are neither simple as in the female, nor pectinated as in the male, but about half-way between. The proportion of females here of this species is very curious. You can get any number in an hour or so, while my experience has always been in the New Forest, that you have to beat for an afternoon to get one or two, although males are plentiful enough. My second visit was exactly a calendar month later; *B. piniaria* and *M. liturata* were still in evidence, and *Plebeius aegon* was dotted about at rest on the heather. I did not work the pines much, but after boxing a few *Scoparia dubitalis*, made straight for my copse and birches again, where I got another *E. undulata*, nine very fine *Platypteryx lacertula*, three each *P. falcula*, *Ephyra pendularia*, *E. punctaria* and *Crambus pinellus*, and in a corner among some alders, a nice lot of *Eupisteria heparata*. *Calligenia miniata* occurred here as at Chattenden—it has certainly been a "footman" year—and in the copse a nice specimen of *Rivula sericealis*—surely rather a strange locality. While waiting for my train, I found *Pachygenemia hippocastanaria* and *Lycophotia strigula* (*porphyrea*) common over the heather (where I had also noticed *Endotricha flammealis* very abundantly before dark) and regretted that the train turned up sharp to time. Betchworth: My last afternoon excursion was made two days later (July 29th) to Betchworth for *Pamphila comma*. They were very common, but how difficult to get at! Never settling but on the bare sun-dried hillside, at the steepest part, it took me two or three hours of the hottest work I have known to get four specimens. This year I mean to tackle them with the aid of spiked shoes, which would greatly assist, as many a specimen was lost, by a

slip at the critical moment. The flowery hollows were avoided by this species, but produced an abundance of *Eubolia bipunctata*, and many nice *Aspilates gilvaria* and *Acidalia ornata*. *Herbula cespitalis* and *Ennychia cingulata* were in profusion everywhere, with a few *Pyrausta purpuralis* among them. *Polyommatus hellargus* I suppose was not out yet, as I saw none, and a single *P. agestis* was the only "Blue" seen, besides myriads of *P. icarus*. NORFOLK BROADS: Saturday, August 5th, found me established in my old quarters at Mr. Bullman's, Wicken, for a week's fen work. This visit was destined to be cut short, as on the first evening I met Mr. W. J. Kaye, and upon his kind invitation agreed to join him in the "Broads," on a campaign against *Nonagria brevilinea*. Mr. Kaye has already told how we fared, braving blank and foggy nights, until upon the fifth and last one, we were rewarded by filling all our boxes with *N. brevilinea*, *N. neurica*, *Lithosia muscerda*, *Hypenodes costaestrigalis* and many other nice things. I would here mention that Mr. Kaye recorded *Leioptilus microdactylus* upon the strength of four specimens taken by myself. It was, however, owing to a misunderstanding between us, as my specimens were taken at Wicken and not in the Broads. Two of them were unfortunately destroyed by a hot poker, which Mrs. Bullman dropped on them—treatment which was too severe for this delicate species. I have also amongst my Crambi some specimens of *Crambus sylvellus* and two *Calamotropha paludella*, which I believe Mr. Kaye did not record. WICKEN: I am afraid I have already trespassed too much upon your space, so will briefly pass over my three days at Wicken, especially as the regular species are so well known, and all occurred much as usual. Light was good, and treacle excellent. *Tapinostola hellmanni* was far in excess of its usual numbers, and 50 to 100 could have been taken each night. It comes to treacle very late, when other things are going, in this way resembling *Leucania lithargyria*. *Viminia renosa* seems to be getting scarcer, only ten specimens in all occurring. *Eutricha quercifolia* was not seen, but *Papilio machaon* was commoner than ever. *Nascia cilialis* occurred as late as August 8th, and *Pyrausta purpuralis* came sparingly to light, curiously nine out of ten specimens being taken from the back of the sheet, a rare occurrence with most species. *Cidaria sagittata*, which for some years past has been exceedingly rare at Wicken, turned up in some numbers. Mr. Kaye first discovered the larvæ, and kindly put me on the track. I did not hit off his spot exactly, but found another near by, where they were even commoner. We each collected some of the largest and left many feeding. I found them in three places, and in one of these spots there must have been some hundreds, as upon one head of *Thalictrum flavum* I counted ten, and few heads were without any at all. HIGHGATE: After this I had no time for collecting, but noticed *Macroglossa stellatarum* commonly in the gardens round Highgate, during September, and in the same month took a short series of *Eugonia fuscantaria* from gas lamps. In conclusion I should like to record the extreme abundance of *Pyralis costalis* round here during July and early August. It always occurs, but last summer on favourable nights, six or eight were frequently observed on a single lamp. Mr. Kaye tells me he has observed the same thing, in a less degree, at Worcester Park.—RUSSELL E. JAMES, 18, Onslow Gardens, Highgate, N.

NOTES FROM SOUTH-WEST SCOTLAND DURING 1899.—The past summer,

though it will be well remembered for the long spell of magnificent weather, was preceded by a spring cold and wet, when little could be accomplished by the lepidopterist. *Phigalia pedaria* and *Hybernia marginaria* appeared about their usual date, however, as on February 25th I picked up both in Cadder Wilderness, and on March 4th, from several ♂ s of the latter, I obtained a beautiful very dark almost melanic aberration at Johnstone. This dark form is not uncommon in the Paisley district. *Larentia multistrigaria* was out on March 11th, a fine specimen being taken from a wall at Milngavie. On the 15th, the first specimen of *Eupithecia helveticaria* emerged in my breeding cage, and continued to come out intermittently till May 12th, the majority of the specimens being of var. *arcuthata*. On May 18th I obtained *Tephrosia bistortata* at rest, on a larch in Glen Falloch, it being the only species of lepidoptera observed that day, as rain fell almost incessantly, and a bitterly cold wind was sweeping down the glen. Mr. Anderson Fergusson and I found, to our discomfort, that we were stranded there for the whole day, there being no return train till the evening. We, however, laboured away through all the rain, in search of Coleoptera and were very successful, but we were pretty specimens on reaching home. On June 10th I went to Arrochar for *Scopula decrepitalis*, it was, however, disappointingly scarce, as only some seven or eight fell to the net. I should have obtained many more, but the wind being high they were carried out of reach before I could strike, and an outflanking movement was quite out of the question, owing to the huge boulders and deep brackens scattered over the portion of the hillside on which I was collecting. Several *Melanippe tristata*, *Coremia spadicearia*, and *Panagra petraria* were taken, and a single type of *Eupithecia scabiosata*, but the capture of the day was a fine aberration of *Brenthis selene*. The specimen is unusually dark on the upper surface, while on the underside, around the transverse series of spots parallel to the hind margin of the posterior wing, there is a suffusion of black scales, which almost entirely obliterates the spots, with the exception of the two central ones placed in the yellow area, these black scales are also repeated at the apex of the anterior wings. An afternoon at Gourock, on the 17th, produced *Larentia salicata*, *Eupithecia satyrata* var. *callunaria*, *E. nanata*, *Mixodia schulziana*, and *Dicrorampha herbosana* in some numbers. On the 24th I was at Lamington, but the only lepidoptera seen in abundance were the Pierids and *Coenonympha pamphilus*. An evening at Crookstow, on July 7th, found *Plusia festucae*, *Apamea basilinea*, and *Hepialus velleda* common, and a single specimen of *Eupithecia pygmaeata*: on the 8th, *Satyrus semele*, and *Polyommatus icarus* were out in abundance at Irvine, and a single specimen of *Anerastia lotella* was captured. My holidays were spent at Barr village, south Ayrshire, during the last fortnight of July. The weather throughout was excessively hot, leaden grey skies and the atmosphere very fiery. Insects are like human beings, I think, and in weather of this nature they apparently have no inclination to exert themselves. I never saw the Rhopalocera so abundant before, however. In the moist hollows on the parched and dry hillsides, *Polyommatus icarus*, *Pieris napi*, and *Epinephele janira*, when disturbed, would flutter out from amongst the rushes literally in dozens. *P. napi* interested me most, as I am always on the look out for aberrations. I obtained one ♀ with the yellow of the underside of a decidedly

ochreous tone and with only very faint traces of the darker scaling on the nervures; of *E. janira* I also obtained a nice aberration. It is a ♀ in which the ochreous band on the underside of the posterior wing running parallel to the hind margin is much narrower than usual, and is divided in two at vein 4 (Meyrick). *P. brassicae* and *rapae* were both abundant about the village. *Aglais urticae* and *Pyrameis atalanta* were also obtained, *C. pamphilus* was everywhere in evidence, and *Enodia hyperanthus* occurred in a marshy field about a mile off. Of *Hepialus* I only observed *humuli* and *lectus*. A single specimen of *Cleora lichenaria* flew off from a lichen-covered larch, but beating all through the wood failed to produce another. Several specimens of *Acidalia bisetata*, *Larentia olivata*, *Melanthia bicolorata*, *Coremia munitata*, *Cidaria prunata* and *C. fulvata* were taken, and a host of commoner species netted. *Orthotitha limitata* turned up everywhere, and was very variable. A couple of full-fed larvæ of *Dicranura vinula* were picked up from the road adorned in their travelling apparel, they spun-up immediately on being put into a box. Of the Noctuids a few each of *Triaena psi*, *Leucania conigera*, *Apamea gemina*, *Plusia chrysitis*, *P. r-aureum*, and *P. iota*, were taken. A single *Tapinostola fulva* on the 29th of the month, which is a remarkably early date for this part of the country. *Pyrausta purpuralis* and *Herbula cespitalis* were occasionally met with on the hillsides. *Scopula lutealis*, *Scoparia dubitalis*, and *S. ambigualis* were very abundant, and *S. murana* could have been taken from walls in plenty. *Miana bicoloria* was very common in Giffnoch quarries during the first week of August. On the 12th, at Irvine, I obtained a dozen *Crambus latistrius*, a single specimen of *Chrysophanus phlaeas*, and several Tortricids and Tineids. An afternoon at Whistlefield, Loch Long, on the 26th, produced *Cidaria immanata*, *Larentia olivata*, *Cidaria testata*, and several *Celaena haworthii*. *Phibalapteryx lapidata* was out, and in fine condition, on the Lanarkshire hills on September 8th, and the following day on the Kilsyth hills, I obtained a few more. *Tapinostola fulva* was abundant at both these localities. In Kilsyth glen several *Pyrameis atalanta* were discovered at rest on the trunk of an ash, to which they persistently returned when knocked off. I also obtained a fine specimen of *Polia chi* var. *olivacea*, the first of this variety I have ever taken in this district, though I must have seen several hundreds of the type. *Pyrameis atalanta* was very abundant in the Clydesdale district during the autumn months, which coincides with reports from other parts of the country. *Cheimatobia brumata* was also very common at the beginning of November on the banks of the Clyde at Cambuslang, on some trunks I counted three and four, and even five specimens at rest.—And. Adie Dalglish, F.E.S., 21, Princes Street, Pollokshields, Glasgow.

Entomological note from the Riviera.—The season appears to be an abnormal one, the usual rains last October were scanty, the winter has been dull and cold, and for the present the weather is cold and wet. Vegetation and insects are a full month late. So far as butterflies are concerned, the record would be not very different from the celebrated chapter on snakes in Ireland. On March 5th there lay six inches of snow on the ground at 5 a.m., and this still existed in shady corners two days later. Rain has been frequent—all day on March 18th, and from the evening of the 19th till the forenoon of the 21st. Those who have not left England in search of the "Sunny

South" are on the whole to be congratulated. On February 27th three *Epichnopteryx pulla* ♂ were found floating in the canal. *Pararge megaera* was on the wing, *Pyrameis atalanta*, *Pieris rapae*, and *P. napi* seen. March 2nd, first *Pieris daplidice* seen, *Stenopteryx hybridalis* (*noctuella*) frequent, *Diurnea fagella* on oak trees, coltsfoot in full bloom. March 6th, first *Cyaniris argiolus* and *Callophrys rubi* seen. March 10th, one *Anthocaris belia* seen. March 12th, found a strong colony of *Luffia*, sp.? at Agay, not yet half grown, some very small. March 13th, rather a brighter day than usual; saw in the Auribeau valley several *Gonepteryx cleopatra*, one *Papilio machaon*, *Pararge egeria*, *P. megaera*, two *Anthocaris belia*, two *Colias edusa*, several *P. daplidice*, *Callophrys rubi* common, *P. napi*, *P. rapae*, *P. brassicae*, *Polygonia c-album*, *P. egea*, *Pyrameis atalanta*, and *Vanessa io*. Half a dozen plants of *Biscutella* coming into flower, others invisible. These must have been odd ones stimulated by some one fine day that failed to start the mass of the plant into spring life. Various larvæ have been seen; one good capture was a ♂ of *Scodiona lentiscaria*, found in the Estérels, March 3rd. M. Constant has only one specimen of this species, it occurs at Hyères and in Spain. *Chesias rufata* is rare here, according to M. Constant, a specimen was taken on March 19th. The form here is wanting in the brown or fulvous tint of northern specimens, and resembles exactly in tone, and to some degree in marking, *A. plagiata*. The cases of *Tinea vinculella* (or some allied species) are also everywhere usually very scarce, an odd one at long intervals, but here and there plentiful on damp shady walls. With regard to this species I note that it may often be found *under* stones, as in many of the stone slides in the Estérels, where none make an appearance in any exposed place. I was still more struck with the same circumstance in regard to *Fumea* cases. In the Estérels and elsewhere these occurred frequently *under* stones, where no exposed ones existed. These were always empty ones of last season, it being too early this late season for new ones. The dryness and aridity so frequent here, even at this early date (not unfortunately this year), no doubt accounts for such habits, but *Fumea* in the chrysalid stage certainly classifies itself in our ideas with the sun-loving Psychids. So that a habit of hiding at this stage is at first somewhat startling. It is no doubt owing to some similar habit that a search for cases, new, old, or at any stage, of M. Constant's *Bankesia vernella*, in places where he has captured the moth, was utterly fruitless.—T. A. Chapman, Cannes. *March 21st*, 1900.

VARIATION.

Agrotis exclamationis with aberrant claviform stigma.—I took at Eastwood July 6th last, a slightly crippled *Agrotis exclamationis* with a doubled claviform on the right fore-wing.—F. G. Whittle, Southend.

Protective resemblance.—Whilst hunting for larvæ at Frognal, Hampstead, last summer, I was very much struck by the remarkable protective marking and colouring of a nearly full-grown larva of *Amphydasis betularia*, which was on a rosebush in a waste garden. Not only was the contour and shape of the posterior extremity of the larva, with its claspers firmly grasping the stalk, almost an exact representation of a petiole of the plant, half an inch or so distant from it, but

both insect and plant were marked with more or less regular circular bands of alternate pale green and rose pink. The only observable difference between the larva and its food-plant was the comparative thickness of the larva, which was about double the size of the leaf stalk.—Hubert S. Phillips, M.R.C.S., F.E.S., 262, Gloucester Terrace, Hyde Park, W. *March 20th*, 1900.

SCIENTIFIC NOTES.

Vitality of Smerinthus ocellatus bred in confinement.—I was much interested in M. Lambillion's note on *S. ocellatus* (vol. xi., pp. 330-2), but I am not at all surprised at the different power of egg-laying exhibited by the wild and artificially reared females. He reared a brood of 200 (10% of which were cripples). It is hardly possible that they could have obtained throughout their lives all the food they required. My own experience is that 50-60 require considerable active work to feed them, and artificial rearing is apt to hurry larvæ when almost full-fed, as many species, in natural conditions, often go on feeding after fullgrowth is apparently obtained. Only a few of the very strongest individuals could possibly reach maturity under natural conditions, hence the test is scarcely a fair one.—A. Bacot, 134, Lower Clapton Road, N.E.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Newly-hatched larva of Erebia ceto.—About 3mm. in length, by ·4mm. in diameter, dorso-ventrally, at 2nd abdominal segment. The lateral diameter slightly greater. *Head:* Large (·6mm. in height), tall, wide, and thick from front to back. Rounded, with a rough pitted surface that gives it a granular appearance. Colour, pale wainscot brown. The hairs are short, stout, tapering, slightly curved and thorny. Those on crown of head correspond with those on dorsal area of body in that they are very short and much curved. *Body:* Of even thickness, and all the segments are of about equal length. Divisions not deeply cut, but clear and distinct, each abdominal segment having five almost equally well marked subdivisions, thoracic segments only four, the anterior of which is considerably larger than the following ones. The anal segment projects beyond anus dorsally. The skin is rough and granular in appearance, the colour like that of head, pale wainscot-brown, with a narrow darker mediodorsal stripe, and three narrow laterals of the same tint. The uppermost of these might perhaps be more correctly called a subdorsal stripe. The lateral flange is slightly raised, and is beneath the lower of the lateral stripes, situated on a broad band of a somewhat paler hue than the ground colour. *Tubercles:* The dorsal tubercles i and ii, are small in area, but rather tall, cone-shaped, bearing one very short, stout, tapering and thorny hair; these hairs curve backwards to an almost horizontal position, reminding one of those on the adult larvæ of *Charaxes jasius*, i and ii are situated in transverse line on the 2nd subsegment of meta- and mesothorax, but are far apart (on 1st and 4th subsegments) longitudinally, and in markedly trapezoidal position (ii much further from median than i) on the abdominal ones. The dorsal hairs on anal segment are much longer than those on other segments, and jut out beyond the segment. Tubercle iii is in line above spiracle, iv and

v are a short distance beneath, iv first sub. and v sub. and very slightly free. The hairs and tubercles being similar to i and ii but the hairs being less curved are more upright. Two marginal tubercles, each bearing one hair, are present, and on segments that bear prolegs, they are situated on the base of prolegs. Both true legs and prolegs are large and strong, the latter have a curved row of eight or nine hooks on the inner side only [Described December 10th, 1899, from larva preserved in spirit].—A. Bacot.

Forcing Porthetria dispar and Lymantria monacha Ova.—On December 18th, 1899, I placed about 300 ova of *Porthetria dispar* in a chip box and kept them on the mantelpiece in a room where there was a good fire all day. In little more than a fortnight the larvæ began to appear, about a dozen ova hatching on January 3rd, 1900. It was rather difficult to know upon what to feed the young larvæ at this time of the year, but after trying fir and most of the plants now to be found in gardens, they settled down to the leaves of *Campanula trachelium* (Canterbury Bell), on which they are feeding well. By January 15th all 300 eggs had hatched, while many of those larvæ which had made their appearance first were on that date undergoing their first change, several on the 19th appearing in their new skin. I am also attempting to force ova of *Lymantria monacha*, but at the time of writing they have not hatched, though I began forcing them on December 30th last. It is rather curious* to note that while it has taken only fifteen days to hatch out ova of *P. dispar*, the *L. monacha* ova under exactly the same conditions have not yet hatched (February 5th), a period of 37 days. I think the reason may be that the heat was too great sometimes and they have become dried up. I hope, though, that they will yet hatch. As *L. monacha* is known to feed on fir, I thought it very possible *P. dispar*, its near relative, would likewise do so. I do not know if this latter insect has ever been induced to feed on fir. My attempt was quite unsuccessful. On February 3rd many of the larvæ began their second moult, while some were no bigger than when newly hatched.—C. B. Antram, Croydon. *February 5th*, 1900.

Foodplants of Callimorpha hera.—I have about 150 larvæ of *C. hera* (Devonshire), and find they feed well in captivity on *Campanula trachelium*, which I can get more easily than groundsel, plantain, white dead-nettle, &c.—C. B. Antram. *February 5th*, 1900.

* Is this really curious? *P. dispar* is, so far as the evidence goes, almost certainly an introduced species, with more or less south European habits of hybernation, whilst *L. monacha* is a *bonâ fide* Britisher, with very different notions of hybernation.—Ed.

CURRENT NOTES.

The City of London Entomological and Natural History Society will hold a conversazione and exhibition of entomological and other natural history specimens, &c., at the London Institution, Finsbury Circus, E.C., on Tuesday, April 24th, 1900. Tickets (1s. each) (must be previously obtained) from the Hall Porter of the Institution, Finsbury Circus, or from the Secretary of the Society, S. J. Bell, 150, Stockwell Park Road, Brixton, S.W. Doors open at 7.30 p.m.

Our readers will learn with regret of the death of the celebrated Micro-lepidopterist Dr. O. Hofmann, which took place on February 22nd.

His work, justly recognised for its care and thoughtfulness, will be his most fitting and lasting monument. To us, who have recently been so intimately concerned in working out the excellent papers on the *Psychides*, written some 40 years ago, his death comes as a personal loss, and with a deep feeling of regret that another great master has passed from among us. We trust that his types (and those of Herrich-Schäffer and Heinemann that are in his collection) will be obtained for the use of future English students.

The sale of the collection of lepidoptera made by the late Mr. S. Stevens took place on March 27th-28th. Among the specimens were many of Haworth's types, and other valuable historical material. We suspected that the British Museum authorities would have recognised the importance of obtaining these specimens and would have taken steps to have annexed them for the National collection at the Natural History Museum. It would appear, however, that lepidoptera are about the last thing that the powers that be purchase now for the collections.

Speaking of the collections at South Kensington, one suspects that they are intended primarily for the use of students. One is tempted to ask whether the collection of Heterocera is, at the present time, of the slightest use to real students. In working through the Psychids we have found ourselves hampered at every turn (1) by the want of material, (2) by the way in which so many species are incorrectly named. One does not feel inclined to grumble if the official staff cannot always name Fumeids, but one is staggered when one discovers Frey and Zeller's examples of *Ptilocephala angustella*, H.-Sch. (=*atra*, Esp.) and *P. atra*, Linn. (=*plumifera*, Ochs.), all lumped into one series, and now that our attention is being turned to the Lachneids, the pairing off of a fine ♀ *Lasiocampa quercus* with a pale male of *Pachygastria trifolii*, the interchanging of females of *Lachneis cataxe* and *L. rimicola*, and the union of Frey and Zeller's examples of the allied *Malacosoma alpicola* and *M. franconica* into one heterogeneous series, are among our first discoveries. We have previously expressed our regret that the authorities of the British Museum permitted any interference with the collections of two such naturalists as Zeller and Frey, and the injury done by their absorption in the general collection is, scientifically, incalculable. Insects comprise four-fifths perhaps of the fauna of the world. Their study is infinitely more intricate and difficult than that of the Vertebrata, &c. We should be interested to learn whether four-fifths of the money granted for purchases go to the insect department, and if not what determines the percentage? With regard to the existing blanks of comparatively common species in the collection, we gather incidentally that these are not likely to be filled up, and the students and workers at lepidoptera will have to struggle with the incomplete material at present there. What have the Trustees, who are entomologists, to say in the matter? Will they not insist that a fair share of the money that is spent goes on insects, other than those required for the work of the official staff?

The prices fetched for some of the specimens at the sale of the "Sam Stevens'" collection were remarkably high and this was especially the case with the Rhopalocera—*Pieris daplidice*, £1, 12s., 14s. (for two); a fine ♂ aberration of *Euchloë cardamines* without central spot and black tips to forewings, a ♀ with exceptionally large central spots

and a ♀ *Gonepteryx rhamni* with darkened nervures, £2 7s. 6d.; a gynandromorphous example of *Colias edusa*, £3 10s.; aberrations of *Dryas paphia*, £3, £4 10s., £2 10s., £1; aberrations of *Argynnis aglaia*, £1 1s., £2 10s., £5 5s. (ab. *charlotta*); aberrations of *A. adippe*, £6 16s. 6d., £3 10s., £3 5s., £3; *A. lathonia*, 11s., 32s. 6d., 35s., 10s. per pair—whilst two of Parry's discredited *A. niobe* and an *A. lathonia* from the same source, fetched 16s.; aberrations of *Brenthis euphrosyne* went for £4 10s., £2 5s., £6, £1; and the *Melitaea athalia* ab. *cos* (Haworth's type), £6 10.; *Vanessa antiopa* produced 12s. (two), 18s. (two), 20s., 16s., 7s., 20s., 20s. for single specimens; an aberration of *Vanessa io*, £5, one of *Pyrameis atalanta*, £5 10s., and two of *P. cardui*, £6 10s. and £8 respectively; a "black" aberration of *Limenitis sibylla* went for 37s. 6d., another for 63s., and a fine light aberration of *Melanargia galathea*, £7; an aberration of *Pararge megaera*, £5, and two of *Epinephele ianira*, £2 10s. and £4, whilst two of *E. tithonus* reached £5 10s. and 32s. 6d.; a gynandromorphous *Zephyrus quercus*, £3 15s.; *Chrysophanus dispar* produced, per specimen, £2, £4, £8, £6, £5 15s., £5, £6 5s., £6, £5 15s., £4, £5 5s., £4 15s., £5, £5, whilst aberrations of *C. phlaeas* went for 35s., £5 5s., £4; a remarkable underside aberration of *Polyommatus icarus* for 50s., and a gynandromorphous example for £3; *Nomiades semiargus* (in sets of six) went for 50s., 35s., 35s., and the three lots of Hesperids for 67s.; a fine aberration of *Callimorpha dominula* fetched £5 10s., and *Arctia caia*, 20s., 12s., 12s., 55s. (three), 35s. (three), 42s. (two), 80s. (two), 40s. (three), 20s. (four), whilst an *A. villica* went up to £4 10s.; *Ladia caenosa* for pairs produced 30s., 35s., 37s. 6d., 40s., 40s.; *Gastropacha ilicifolia* for pairs, 42s., 42s., 60s., and *Cerura bicuspis*, 18s. (two), 20s. (three), 21s. (three), 21s. (three), whilst another of Bouchard's Killarney *Notodonta bicolor* produced 40s. Small lots of Psychids usually produce good prices, but these ran, 7s., 10s., 20s., 12s., 12s., 7s., 10s., 18s. Most of the other insects ran into good figures—*Agrotis subrosea*, 40s., 75s., 84s., 60s., 90s., 85s., 85s., 75s., 75s., 75s., for single specimens, and *Laphygma exigua* at, 22s. and 16s. may be mentioned, and two *Hydrilla palustris* produced 37s. 6d., whilst 80s. was given for two *Crymodes exulis* (Unst), and 14s. and 30s. each for *Xylena zinckenii*; *Cucullia gnaphalii* brought 28s. and 22s. per pair, a *Micra ostrina* 24s., and two *M. parva* 22s., whilst a specimen of *Ophideres lunaris* went for 28s., and *Catocala fraxini*, 8s., 13s., 15s. and 6s. apiece; *Cleora viduaria*, 35s., 42s., 45s., 47s. 6d., 50s. per pair, and whilst one understands the 52s. 6d. (three), and 20s. (two), given for "Williams'" *Boletobia fuliginaria*, we suspected no one would have given big prices for the "cellar" specimens. *Abraxas grossulariata* produced 45s., 50s., 35s., 35s. and 42s., for single examples, and two *Phibalapteryx aquata* (a second was evidently found in the collection after Mr. Bower saw it), 25s.; *Cidaria reticulata* produced, 12s., 30s., 30s. and 30s. per pair, and one asymmetrical aberration 70s., whilst with *Drepana harpagula* at 32s. 6d., 35s. and 37s. 6d. per pair, we must bring our brief summary to a close. We understand that many lots were purchased on commission for continental lepidopterists. Surely very rare aberrations are worth as much to British as to foreign collectors.

Mr. Elwes and Mrs. Nicholl start for a collecting trip to the Levant about April 15th. The former has been greatly in need of a keen first-class lepidopterist to accompany him on this trip, especially to

collect the Heterocera, but appears not to have been able to have found the right man. This is very regrettable, as one cannot possibly give full attention to both Rhopalocera and Heterocera when on these trips. It takes too much out of one to work day and night.

In the *Proceedings of the American Academy of Arts and Sciences*, vol. xxxv., March, 1900, Scudder gives us another of his useful series of generic revisions. This time it is the genus *Derotmema*, one of the *Oedipodidae*. The species of this genus are desert-haunting creatures, living on and about sage-bush, often simulating it in colour. It is confined to the western half of the United States. He describes four new species, thus bringing the number of known forms of the genus up to eight.

In the *Zoologischen Anzeiger* for March 19th, Dr. Krauss discusses the curious tubercle which is present on the 1st dorsal segment of *Poecilocerus sokotranus*, Burr. This tubercle has the appearance of a small yellowish knob, and at first sight might be easily taken for a foreign body of some sort, possibly a fungus. But Dr. Krauss shows that it is a part of the animal, and probably a very important character. He illustrates his remarks with four drawings, which show well the remarkable open space in the suture of the elytra, which makes room for the organ, and exposes it to the light. It is present on every specimen which has been taken, in both sexes, but is unknown in any other Orthopteron. Dr. Krauss suggests that possibly it may be a luminous organ.

At the last meeting of the Entom. Soc. of London, Mr. Waterhouse exhibited a tube which formed the entrance to a nest of a *Trigona*, sent from Singapore by Mr. H. N. Ridley. It was about fifteen inches in length, of a resinous substance, but more waxy toward the end, which was spoon-shaped. He also exhibited a portion of the resinous mass formed within the trees by these bees, and stated that one of these masses sent from Penang by Mr. Ridley weighed 15lbs. The true nest of the *Trigona* consists of an irregular mass of cells filled with honey, quite distinct from the resinous formation.

REVIEWS AND NOTICES OF BOOKS.

Interesting chapters from Indiana.—An interesting little work, *Gleanings from Nature*, by W. S. Blatchley, the State Geologist of Indiana, U.S.A., contains among the fifteen chapters into which it is divided, two that are very interesting to entomologists: (1) In that entitled "Indiana caves and the animals which inhabit them," are descriptions of blind beetles, cave crickets, &c., as well as an account of the discovery of the Tineid *Blabophanes ferruginella*, Hbn., in the depths of Wyandotte Cave, interesting subjects that call for the attention of the lepidopterist. (2) "Katydids and their kin," thirty-one species of the orthoptera of Indiana being figured and numerous details of their life-histories given. The volume is well bound in silk cloth, consists of 348 pp., 15 full-page half-tone plates, and 100 illustrations in the text, and is published by the Nature Publishing Co., Indianapolis, Ind., U.S.A., post paid 5s. 3d.—Harry Moore, F.E.S., 12, Lower Road, Rotherhithe. *February*, 1900.

West, Newman lith.

Antennæ of Psychides

Entom. Record, etc., 1900.

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XII. No. 5. May 15th, 1900.

Phorodesma smaragdaria, Fabricius.

By Rev. C. R. N. BURROWS.

For a great many years in my early entomological life, I kept the label belonging to *Phorodesma smaragdaria* amongst those of the "unobtainables," kept because it seemed silly to throw such things away, but put aside in case they might turn up useful some day. It was not, however, until I got into the marsh country, and found myself residing at Rainham, that I began to have hopes of success. Thomas Eedle had told me the food-plant years before, and one of my first excursions to my river-frontage was in quest of *Artemisia maritima*, but there was not a root to be found, and I found myself disappointed. Of course everybody knows that the larva is exceptionally difficult to find, and that the imago is but rarely taken except by those who know the exact locality, the time of year, and the habits of the insect. The beginner wants an introduction. My own experience teaches me that without a friend with knowledge, the collector may entirely fail to see even a trace of the larva, where it is actually in fairly large numbers. I have spent hours on the river-wall searching the *Artemisia* most carefully, without success, and then, just when I had to leave, got "my eye in" and made a bag. In 1893 I made the acquaintance so long desired. Mr. Whittle, of Southend, gave me the introduction. He took me to Canvey Island, and showed me, in the exact place I had so often searched, the larva feeding. Since that time I have had no more difficulty, and have generally managed to find enough for myself, and for friends. The life-history of the species given by Mr. Elisha in his paper, read before the Entomological Society of London, October 6th, 1886, and published in the *Transactions*, pp. 465-8, for that year, is so complete, and so entirely bears out my observations, except in one or two points, that I refrain from entering into this subject, simply recommending any one who wishes to know more about it, to read that most interesting paper.

With us the larva appears to be found only upon *Artemisia maritima*, and on the saltings of the Essex coast. In the original description by G. Koch [*Stettiner entomologische Zeitung*, xii., p. 265 (1851)] it is said to have been discovered by Herr Verwalter Muhlig, feeding upon *Achillea millefolium*, in the town woods of Frankfort-on-the-Main, and in confinement, to have eaten *Poterium sanguisorba*. Such complete divergence in habitat and food-plant seems to be very extraordinary, and so far as I have been able to learn, has never been explained. I

cannot contradict the statement, though I cannot believe it. The larva has been, I read, twice publicly exhibited in London, resting upon *A. millefolium*, but I fancy this has been from motives of policy rather than as a demonstration of fact. I have tried common mugwort (*Artemisia vulgaris*) without success, "southernwood" is the well known substitute for *A. maritima*, and I have found that both these plants will be deserted for the common wormwood (*A. absinthium*). In fact, I find that the latter plant produces finer imagines than the better known pabula, and it was upon this that I last year reared from the egg a partial second brood, out of doors, and entirely unconfined.

The clothing of the larva (pl. vii., fig. 5) is one of the most remarkable points in the life-history of the species. One cannot but wonder what is the purpose or use of this fragmentary case, so unusual amongst lepidoptera, that I can recall only one similar, that constructed by the larva of the nearly related *P. pustulata*; but the food-plant, habits, and habitats of these two insects are so completely opposite, that one fails to see what needs, except of concealment, they can have in common. As a matter of fact the use is more clear in the case of the species before us than in that of its relation, as we can understand that *P. smaragdaria* requires some sort of protection from the floods, to which its particular habitat is periodically subjected. The saltings upon which the food-plant flourishes are below the high water mark of flood-tides, and, therefore, at such times, the plants and the larvæ feeding thereon, are for a time (probably never more than an hour) totally submerged. Mr. Auld in his paper (*Ent. Mo. Mag.*, March, 1895, p. 57) mentions this fact, and Mr. Whittle and I, one day, when the larvæ were very abundant, and our boxes full, watched for some time the rising water gradually, but completely, covering the larvæ. The bath troubled them not in the least; thrown upon the water, the case acted like a life-buoy, and the larvæ which were upon the plants did not let go, they calmly and resignedly held on. Here certainly comes in one of the uses of the case. The fragments of leaf and the entwined silk imprison a large quantity of air, and this is quite sufficient—probably much more than sufficient—for the period of submergence. These baths must be rather trying during the winter months of hybernation, and the coat will then not only keep its wearer dry, but warm as well, as he sleeps low down amongst the roots and grass. So difficult is it to remove this imprisoned air, that, for the purpose of mounting for the microscope, I have found it necessary to put the larvæ into ether before placing in the cells. Everybody seems to think that the fragments constituting the coats are gummed, or stuck on to its back by the larva, by means of some kind of marine glue or hydraulic cement. I could never believe that, but could not say how it was effected until Mr. Bacot put me on the scent, and the whole credit of the observation belongs to him. The secret will be revealed by the drawing which I have made. There are (from the time of hatching) special knobs or hooks upon the skin of the larva, to which, by means of silken threads, it can fasten the bits where they are most wanted. There is a strange variation in these special hairs or knobs, in that they are not of the same character throughout the whole period of larval life. When the larva first comes from the egg, hairs, with either "turf-cutter" heads, or "trumpet" heads (pl. vii., figs. 3*a-d*), enable the young caterpillar easily to entangle its delicate silk, and the minute fragments of plant-hair, dust, &c., in the form of little

pills, which then cover the special parts of the body, and make the little creature, when its head is drawn down, exactly resemble the flower- or seed-heads of *A. maritima*. Later in life (I cannot say when, but before hybernation) these hairs disappear, and are replaced by curious warts, crowned with short, thick spines, and the sides closely covered with colourless, glassy, recurved hooks, better suited to hold firmly the large fragments now used. The position of these special organs—if such they can be called—will be more fully specified in the notes which Mr. Bacot has kindly provided, and may be seen in the plate. It is easy to see that when at rest, or alarmed, the head and thoracic segments being drawn under the abdominal segments, the coat will almost completely cover the larva, and effectually conceal it. Pupation is undergone in a loose, but symmetrical cocoon, composed of rough silk and leaf fragments, very similar to, if not actually identical with, those which have composed the coat. This cocoon is placed rather low down upon the stem of the food-plant, and is both difficult to find and risky to deal with. The pupa is delicate, and before one discovers it, one is likely to do it a fatal injury. Of six which I detected in my garden last August only one was uninjured.

I have found some difficulty in learning what is known about the variation of *P. smaragdaria*. Mr. Prout has most kindly gone into the matter for me, and tells me that very little appears to have been recorded. Millière (*Iconographie*, iii., pp. 423-25, pl. cliii., figs. 116-118) describes and figures a very large form as var. *gigantea*. Staudinger in his *Catalogue*, mentions a *P. smaragdaria* var. *prasinaria*, Evers. = *volgaria*, Guénée. It is much smaller, the wings more pointed, the white bands a great deal broader, and the hindwings whiter. It is not uncommon in southern Russia, and appears in May. This insect Millière considers to be a distinct species. Beyond these there do not appear to be any described varieties. This has rather surprised me, because in the few of which I have been able to get particulars, there appears to be a considerable range of difference, the reason of this being probably that those series of which I have received details are picked out of much larger numbers.

Of 245 specimens examined, I have found almost every possible variation except in colour. Neither the spot, nor the lines on the forewings are constant. The former varies much in size, and is sometimes, I must believe very rarely, entirely absent. The lines are made up of elongated blotches, or crescents, between the wing nervures, sometimes quite detached, sometimes entirely united. The inner line is less constant than the outer, which persists after the inner has quite disappeared. The following is a summary of the results obtained:

1. Forewings with no spot, ab. *obsoleta*, n. ab. 2
2. Forewings with no transverse line, ab. *alinea*, n. ab.. 3
3. Forewings with outer transverse line only, ab. *unilinea*, n. ab. .. 79
4. Forewings with both transverse lines = *smaragdaria*, Fab. .. 158
5. Colour decided blue-green = ab. *caeruleo-viridis*, n. ab. 2
6. Colour of a much more vivid green = ab. *viridis*, n. ab. 1

The costal line appears to vary a little in width, and is generally yellowish, although sometimes (? in very perfect specimens) it is decidedly red. The base and costa of the hindwings are more or less extensively white, or yellowish-white. I fancy the more starved the specimens the more extensive is this white patch. I have not noticed that any of these variations have to do with sex.

(*To be continued.*)

Lepidoptera at Locarno.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Locarno does not appear to have escaped the inclement and late winter that affected so large a part of Europe, and during the portion of April I spent there things were quite two or three weeks later than in 1899. On April 6th, 1899, I saw 26 species of butterflies in a quarter of an hour on a scrap of ground of about one-eighth of an acre. Several days later this year the same spot had quite a wintry aspect and no grass had begun to grow. On the 14th a couple of warm days had given the grass a start, but a solitary *Euchloë cardamines* was the only butterfly to be seen on this spot. This year there had been no warm or even fine dry weather up to the middle of April, hence the difference. Last year *Polyommatus orion* occurred everywhere during the first half of April. This year two very small specimens were seen for the first time near the Madonna del Sasso on April 15th, and were so far the only Lycænids observed. The 18th and 19th were two fairly warm days, and on the 20th *P. orion* was flying more freely.

Nevertheless, it would be wrong to represent butterflies as absent. On every bright day *Gonepteryx rhamni* was seen flying solitarily nearly everywhere, but altogether in some numbers, but certainly less freely on the 18th and 19th, when some warm weather began. Of other hibernated species, *Vanessa io*, *Aglais urticae*, *Eugonia polychloros*, *Polygonia c-album* were tolerably frequent, *V. io* being the most abundant, but very closely followed by *Euranessa antiopa*, which occurred everywhere, a score or so being sometimes seen in a day's walk. Last year only one or two were seen, the difference being very marked, the most abundant home being apparently in the Val Verzasca. Unlike the English (?) specimens, with their classical white borders, that I saw so abundantly at Grenoble some few springs back, these were all genuine continental specimens, with straw-tinted borders, and some specimens were very fresh and in fine condition.

Of spring emergences *Papilio podalirius* was the most notable species. The first was seen on April 10th, and after a few days they were quite frequent, loving to settle and feed on the blossoms of the peach trees, which by the 16th were in full bloom, making a most pleasing combination of form and colour. The peach trees alone in full bloom resulted in a most glorious effect as seen at sunset from the Ponte Brollo. The wide valley looking up to Intragna is picturesque enough, but the peach trees are here very abundant, and the sun shining through the petals showed their rich colour with a most luminous effect. *Papilio machaon* was also observed on April 10th, but only one or two other specimens were seen. *Argynnis latona* was frequent. A few specimens were worn enough to show that it had been on the wing some time. This seems to be by far the earliest of the *Argynnidae* to emerge, occurring at Cannes in February or even January, and always a good month earlier than *Brenthis dia*, which seems to be the next species to emerge, but not perhaps clearly earlier than *B. euphrosyne*. *Euchloë cardamines*, *Pieris rapae*, *P. napi*, *Pararge egeria*, *P. megaera*, and *Chrysophanus phlaeas* were all more or less frequent, but *P. brassicae* was not specially noted, and was certainly not common. *Coenonympha pamphilus* began to emerge about the 14th. *Leucophasia sinapis* appeared about the same date, and soon

became common. Larvæ of *Gnophos variegata* were found on rocks at several places, and an imago was found at Ascona on the 18th. On April 7th a stout little Oreopsychid [probably *Ptilocephala atra* (*plumifera*)] was found flying at Luino.

The snow was very low on the hills round the lake, some 2000ft. lower than at similar dates last year. On the 17th I went to the top of the hill behind Locarno, some 4000ft. above the lake, the last 500ft. over last winter's snow, still lying 2ft. deep and upwards, where I last year took *Hercyna schrankiana*, flying freely in the sun, a week earlier. My desire, therefore, to make a good bag of larvæ and pupæ of the Fumeas was entirely defeated, as I was three weeks or a month too soon at each place. To some extent this was recompensed by finding cases of *Acanthopsyche opacella* freely at Locarno, as well as of *Standfussia zermattensis*, as also of a *Solenobia*, with very large triangular case and definitely parthenogenetic habits. *Luffia maggiella* (n. sp.) cases were also found at various spots in the Val Maggia. These various Psychids will, I hope, afford material for fuller observations. I may, however, note that even in this late season *Acanthopsyche opacella* must have been emerging for some time before April 10th, though larvæ are still unchanged on April 27th. *S. zermattensis* was emerging on 15th, and obviously had been for some days, whilst half-grown larvæ could still be found.

The Guests of Ants and Termites (*with Plate*).

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

(*Continued from p.* 89.)

The instincts of the ant guests are, moreover, in harmony with the structure of their bodies. Whereas a *Lomechusa*, or an *Atemeles*, places itself in front of the ants with widespread legs and rolled-up abdomen, and taps them with its antennæ as if it knew it was irresistible and attractive as a rightful guest, a *Dinarda* ducks down at sight of an ant and presents its rapidly moving pointed abdomen, as if to say, "Hold me tight if you can."

The *Lomechusa* group in the *Staphylinidae* comprises in the Old World the genera *Lomechusa* and *Atemeles*, and the genus *Xenodusa* in the New World. They all possess a very broad body, a concave thorax bent up at the edges, and an abdomen rolled up to an abnormal position, on the sides of which big yellow tufts of hair are situated. The mouthparts also possess a short broad tongue, and more or less shortened palpi. It is only after observing the habits of *Lomechusa strumosa*, F., *Atemeles emarginatus*, Payk., *paradoxus*, Grv., and *pubicollis*, Bris., for fifteen years that I have been able to determine that these peculiarities are connected with the true intercourse of hospitality. These beetles are fed from the mouths of their hosts, and are licked by them with great pleasure, especially on their tufts of yellow hair. No one, therefore, can doubt that *Lomechusa minor*, Rttr., from Thibet, *L. amurensis*, Wasm. (plate, fig. 3) from Amurland, and *L. mongolica*, Wasm., from northern Mongolia, are true ant guests, and that their intercourse with ants is the same as that of our *L. strumosa* with *Formica sanguinea*, though no one has so far closely observed the life habits of these three Asiatic species of *Lomechusa*. In the same way

we know that the American genus *Xenodusa*, which in that country takes the place of our *Lomechusa* and *Atemeles*, belongs to the true ant guests, and the species are fed and licked by their hosts. These facts are likewise just as certain in the case of the just described *Xenodusa sharpi*, Wasm., from Mexico, and the newly discovered *X. caseyi*, Wasm., from Colorado, as if their intercourse with ants had been closely observed for ten years.

Lomechon alfaroi, which I described a little time ago, lives in Costa Rica with a big ant, *Pachycondyla aenescens*, Myra, of the subfamily *Poneridae*, which has a very powerful sting. The discoverer of this guest, Herr Anastasio Alfaro wrote on the locality label "muerde muy fiero" (it stings fiercely). It proved a real enigma to find a systematic position for this interesting beetle. It did not appear to belong to a quite new genus, yet none of the known families seemed to own it. At first I thought it belonged to the *Endomychidae* as the shape of its body was somewhat like a *Lycoperdina*. This similarity, however, was only a deception caused by the beetle's adaptive characters. Its specific characters were hidden under them, as under a mask. It necessitated an arithmetical operation to subtract the adaptive characters from the appearance of the *Lomechon* to find the family characters. I at last classed it in the *Silphidae* with a certain amount of assurance, of which family it possessed the abdomen, underside and legs, all the other characters were purely deceptive. Its apparent similarity with the *Endomychidae* arose from the shape of the thorax in connection with that of the abdomen. The thorax, however, resembled more that of a very eccentric *Lomechusa* or *Xenodusa*, on account of its broad shell-like shape and upward bent posterior angles. The head was like that of a *Lomechusa*, and antennæ those of a *Xenodusa*. The peculiar shape of the thorax, head and antennæ were, however, only adaptive characters, of biological, but not of systematic, importance. This new creature from Costa Rica must be, like *Lomechusa*, a true guest. It possesses big tufts of reddish-yellow hair, which, however, are not placed, as in the *Staphylinidae*, on the sides of the abdomen, as that part is completely covered by the elytra in the *Silphidae*, but inside the upward bent posterior angles of the thorax. On account of the bunches of tufts of hair which possess so much biological importance, as well as its resemblance to a *Lomechusa*, this new ant guest has received the generic name of *Lomechon*.

Another example of the biological value of adaptive characters was given me lately by a Brazilian Staphylinid. This example is all the more instructive, as it was not even marked "Found with ants." In spite of this, it was easy to determine *a priori*, the name of its host. Father Badariotti, Congr. Sales., sent one from Lorena (Staat St. Paulo) a short time ago, in the same tube with some non-myrmecophilous beetles—a big broad species belonging to the subfamily *Quediini*, which possessed, as far as size and shape, some resemblance to our hornet's guest, *Velleius dilatatus*. Its peculiar colour and hair-growths struck me as suspicious as soon as I took it out of the tube and pinned it. The brown red colour and the shaggy hair reminded me at once of the big neo-tropical leaf-cutting ants of the *Atta* family (*Oecodoma*). I took the lens and studied it closely. The femur and tibia were flat and shaped like leaves, and the antennæ short and pressed to the sides.

The body, broad at the upper part, ball-shaped and pointed at the apex, and the flat outspread thorax which touched the ground, all showed it to be unquestionably a protected guest. By these means, in spite of its large size, 15mm. long, and 6mm. broad, the beetle was able to live amongst the stinging *Atta*, even should they show it but scant affection. The extraordinary likeness which this beetle exhibited in colouring and hairiness to the big-headed red-brown *Atta* was evidently calculated to deceive the host. The colouring and glossiness were intended to deceive its sight, and the hairiness its touch. In the same manner as in the *Atta*, the glossiness of the head contrasts strongly with the dull-coloured body, so with the beetle, the shiny thorax contrasts with the rest of the body. As the ant possesses medium-sized compound eyes, the elements in the *Atta* guest's outward appearance which were calculated to deceive the host's sight are easily understood. The purpose of this passive mimicry, however, was not very clearly determined; it may have been, according to the above mentioned facts, a twofold one; either to make the guest more agreeable to its host, or to defend it more easily against its hostile attacks. It was necessary, therefore, to find other characters to explain this case. It had a fine yellowish golden growth of hair underneath the bristly hair of the abdomen, which thickened into patches towards the edges. Still more noticeable was the thick long yellowish hair on the under jaw which was visible to the naked eye. There were also short golden tufts of hair on the anterior margins of the seven last joints of the antennæ, and lastly a golden-yellow shiny spot on the base of the upper-lip, which enclosed above and below a row of long bristles. These facts was sufficient to convince us that we had here a case of genuine intercourse, though of a lower degree. The result of all these *a priori* considerations is as follows—it is certainly a true guest of *Atta sexdans*, which is the only one of the genus of this shape and colour in that country, it is also one of the protected guests, and probably is not only tolerated because of its invulnerability, but also enjoys a low degree of genuine intercourse on account of its tufts of yellow hairs. I was thinking of describing it under the name of *Attejus bardariottii*, but before doing so it was necessary to search the systematic literature to find out if it was a new species or not. I generally find that the tropical ant and termite guests which are sent to me are new species, but in this case it was not so. In the *Staphylinidae* of the *Biologia Centrali Americana*, by David Sharp, I found my *Atta* guest described and figured under the name of *Cordylapsis pilosa*, F.(*Smilax americanus*, Lap.).

(To be continued.)

Conversazione of the City of London Entomological Society.

By W. J. KAYE, F.E.S.

The conversazione held by the City of London Entomological and Natural History Society, in the larger hall at the London Institution, on April 24th, 1900, proved a complete success, and the exhibits were more diversified and numerous than on the previous occasion three years ago. The excellent musical programme arranged by one of the secretaries, Mr. S. J. Bell, added largely to the success of the evening. British and exotic lepidoptera came in for the largest share of the exhibits. In

the former there was much valuable material offered for inspection. Mr. Southey's small box of *Hemerophila abruptaria* from Holloway, contained some very fine dark brown (inclining to black) aberrations and some intermediates. Until quite recently dark aberrations of this species were extremely rare, and the capture, practically in London itself, of these specimens, is particularly interesting. Mr. Prout exhibited some of his pet "carpets." The *Melanippe montanata*, from Shetland, are very remarkable, the specimens having a very mottled appearance. The *Melanthia bicolorata*, from Forres, exhibit an extremely interesting phase of this species, being of unusually large size, and very strongly marked and without the bluish tint, some ab. *plumbata* were also fine. Dalston specimens of *Melanippe fluctuata* again shows the action of natural selection, as a consequence of smoke and dirt. *Melanthia ocellata*, from Wimbledon, with a very slender band, was contained in the valuable collection. Mr. James showed the attention he had paid to the autumn Noctuids. *Anchocelis lunosa* was represented by a fine series mostly taken in North London. Curiously enough dark aberrations are rare even in London. The red form was well illustrated in the series. Of *A. pistacina* five rows were shown and practically all its forms exhibited. The dark olive-tinted specimens struck one as being the best. Mr. Mera had a fine drawer of *Spilosoma lubricipeda*, which contained, amongst others, some grand intermediates and fasciated examples bred from strongly marked forms, and some var. *radiata* with a particularly broad pale margin. Mr. Bacot had some fine series of "plumes," bred from the material obtained for the purpose of working out the life-histories for publication in one of the future volumes of Mr. Tutt's work on *British Lepidoptera*, and his long bred series of *Spilosoma urticae*, showing extensive variation, was a most interesting exhibit. In Mr. Pickett's exhibit the bred specimens of *Sphinx convolvuli*, with preserved larvæ of same, attracted some attention. The larvæ were, we understand, taken at Dover. One knows that *S. convolvuli* is invariably a migrant and does not often feed up within our shores. Of course one also understands that the migrants must oviposit, and one suspects that those larvæ Mr. Pickett had found had been exceedingly well placed for food and warmth. Some fine *Smerinthus tiliae*, with bands of varying width, an asymmetrical specimen, and one with dark hindwings were amongst those exhibited. Mr. Turner had amongst his specimens a much-spotted ♀ of *Spilosoma mendica*, whilst, besides other nice things, *Lymantria monacha* var. *eremita* was noted. Mr. Clark exhibited some very fine specimens. A series of *Laelia coenosa*, bred by himself from Wicken larvæ, made one wonder if the species will ever be found again. It has now been lost for just twenty years, but other species have apparently disappeared for many years and have reappeared again, so perhaps we may be favoured once more with the sight of this once abundant insect. A full series of *Drepana harpagula*, from the Leigh woods near Bristol, was noted in one of the drawers. It has never yet been cleared up why this species is so local. Does it really not occur anywhere else in these islands? Mr. May had a very full drawer of Agrotids. The long series of *Agrotis corticea*, *A. lunigera*, *A. exclamationis*, and *A. segetum*, containing mostly picked specimens from Sandown, formed extremely interesting studies in variation. The series of *A. exclamationis* might well have puzzled a

tyro as to whether they were all the same species. Sandown is noted for its aberrations of this species. Similar forms are no doubt to be got in other localities if worked as systematically as this locality. Mr. Kaye had a drawer of Nonagrias, with specimens of *Tapinostola extrema* and *Nonagria sparganii*, the latter from the Dover district. Entomologists in want of the latter species should pay attention to the yellow flag, and if this were done we should then probably hear of the insect becoming more generally distributed than it at present appears to be. There were many other interesting exhibits of British lepidoptera, all of which there is not space here even to notice. The magnificent series of *Epunda lutulenta*, exhibited by the Rev. C. R. N. Burrows, must, however, be mentioned. Of the exotic lepidoptera there was a fine show. Mr. E. M. Dadd contributed to these with some fine Catocalas and Vanessids. Amongst the latter was a long series of *Euvanessa antiopa* from Europe and North America. Some of the American specimens had the border much suffused, and taken generally they had distinctly darker margins. Amongst the Catocalas, the United States *Catocala cara* and *C. amatrix*, bred, were specially fine. *C. electa*, also, which comes very close to our *C. nupta*, was amongst a lot of others. Mr. Stanley Edwards gave a splendid exhibit of Papilios, Ornithopteras, Charaxes, &c. *P. adamantius* was amongst many other fine things. The Hestias also were particularly good, but the most remarkable mimic of these unpalatable insects was absent; we refer to *P. idaeoides*, which so closely resembles *Hestia idaea*. *P. memnon*, with a large number of polymorphic ♀ s, was well illustrated. A magnificent specimen of *Morpho cisseis*, from Guatemala, and a specimen of *P. gundlachianus*, from Cuba, also figured in this fine exhibit. The writer, in exhibiting foreign *Sphingidae*, had practically the field to himself. Six drawers were shown, four of which contained examples of the large genus *Choerocampa*. Amongst the others *Cizara ardeniae*, bred from Brisbane, Queensland, was particularly noteworthy, specimens of this unique-looking Sphingid being extremely rare in collections. Fine *Langia zenzeroides*, *Angonyx testacea*, and a series of *Amphonyx antaeas*, taken by the exhibitor himself at jasmine blossoms, were also noteworthy. Messrs. Watkins and Doncaster had lent four cabinet drawers of exotic lepidoptera, and amongst these were some remarkably interesting insects. Two drawers contained examples of butterflies and moths mimicking each other. Amongst some of these were noted *Sangala gloriosa*, a Geometrid moth, mimicked by *Eresia castilia*, a Nymphalid butterfly; *Pericopis leucophaea*, a Hypsid moth, mimicked by *Didonis agamisa*, a Nymphalid butterfly. *Papilio merope*, which is only protected in the ♀ sex, was well shown, the ♀ closely resembling *Amauris niavius*. Another still more interesting "pair" were *Epicopeia polydora*, a moth so closely resembling *Papilio rhetenor*.

Of Coleoptera the exhibits were few but excellent. Mr. E. A. Newbery showed a cabinet drawer containing nearly all the British species of the family *Bembidiidae* and *Hydrodephaga*, and formed a very interesting exhibit. Mr. Clark had some cases of exotic coleoptera, in which were to be found many of the most extraordinary of the world's coleoptera. Amongst these were *Dynastes hercules*, the giant Dominican beetle, *Goliathus druryi*, *Mormolyce phyllodes* and many others. Of the Diptera, Messrs. F. B. Jennings and H. A. Sauzé had lent some of their fine specimens. The former exhibitor had types of the most

conspicuous species of eleven families beautifully mounted for inspection. The exhibit of the latter was a most beautiful collection of small cases illustrating the life-histories of many gall-flies and insects with similar habits. *Aphelotrix lucida*, a species new to Britain, feeding on poplar, was noted; this might perhaps turn out to be *Cecidomyia persicariae*. Of botany and conchology, Messrs. S. J. Bell, F. J. Hanbury and F. B. Jennings supplied material. Mr. Jennings' series of *Helix nemoralis* var. *libellula*, from the Lea Valley, showed the band variation completely. Of Reptilia, we noted a fine specimen of *Alligator sclerops* shown by Mr. Sauzé. Flint implements were shown by Mr. H. A. Fuller, while etchings, photographs, &c., were also on view, and lent by several members. The etchings of British butterflies shown by Mr. H. H. May were excellent. Last, but by no means least, a number of microscopes were lent by Messrs. A. Bacot, J. Burton, S. Edwards, E. W. Lane, H. H. May, C. Nicholson and J. A. Simes, and these gentlemen untiringly saw that the visitors should have the full benefit of their instruments.

Notes on the Fumeids, with descriptions of new species and varieties (*with two Plates*).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

(*Concluded from p.* 93.)

The remaining species all agree with *M. crassiorella* in wanting the "cellula intrusa." They may be divided into three groups, according to the length of the anterior tibial spurs. A group with spurs substantially the same in length as in *M. crassiorella*, or slightly longer ·70-·73, containing *affinis*, *subflavella*, and two or, possibly three unnamed species. A second group consisting of the various forms that we may include as one species under the name of *F. casta*, with four or five varieties, not difficult to recognise, but far from easy to separate conclusively from each other. These all have spurs of length ·77-·81. A third group, with spurs ·84-·86, containing only one species, *germanica*.

The *crassiorella* group possesses certain species that may or may not be distinct from *crassiorella* itself:

(1) *M. affinis*.—According to Hofmann this possesses five antennal joints more than *F. casta* (*nitidella*), therefore 23 or 24 joints. Hence a specimen I have from Staudinger is probably truly that species, agreeing otherwise with the description. It has a spur very slightly longer than *M. crassiorella*, *viz.*, ·70, probably really the same, 24 antennal joints, and precisely the same colouring and wing form as *M. crassiorella*: it is slightly smaller, 12mm.-13mm., and seems to be more densely scaled, the basal half of the cilia of hind margin of forewing looking especially dense. The greater measured length of the antennal pectinations may or may not be a good character. I am not prepared from this one specimen to say positively it is only a var. of *M. crassiorella*, I should be even less disposed to assert it to be a good species or more than a local race of *M. crassiorella* (anterior tibia, pl. iv., fig. 35).

(2) *M. mitfordella*.—We have here certainly a species distinct from any other named form I can find any account of. The specimens it is

founded on are two examples in the collection of Mr. Clark and three in that of Dr. Mason. All are from the collection of Mr. R. Mitford, and those in Mr. Clark's collection labelled by Mitford "n. sp.," but without indication of where he obtained the specimens or on what ground he considered them to be new and distinct. The specimens are faded and not in the finest condition. In general aspect they are very like the small (*nitidella*) form of *F. casta*, with an expanse of about 11mm. The form of the wing seems to differ a little from typical *F. casta*, the base of the inner margin being much less produced in a rounded curve, the base of the wing being consequently narrow and the costa and inner margin are less nearly parallel, but diverge at a wider angle. The antennæ are 17- or 18-jointed (I have not mounted a specimen), and the length of the tibial spur is ·71 and ·73, the lowest figure I have met with in *casta* being ·77. The wing form is so dependent on accidental circumstances of setting that it is difficult to place much reliance on it. Is this the species exhibited at the meeting of the Ent. Soc. of London, March 4th, 1861, and noted as "*Psyche*? Apparently a very distinct species allied to *P. roboricolella*, but the wings much more rounded, as in *P. radiella*" (*vide*, *Zool.*, p. 7453)? These examples might be regarded as very small *M. crassiorella*, if we could assume a range of variation in *M. crassiorella* so great as to allow of a race of 11mm. and at the same time allow the antennal joints to diminish to 17 or 18 (anterior tibia, pl. iv., fig. 39).

(3) *M. hibernicella*.—There are two specimens from Glengariff in Mr. Richardson's collection which not a little resemble *M. mitfordella* in general facies, and one in Mr. Fletcher's collection from the same locality. These have an expanse of 13mm.-14mm. Mr. Richardson's differ a little in facies from Mr. Fletcher's specimen, but I have already noted that setting and accidental circumstances affect this more than any real difference, and the present is I think a definite case in point, since the three specimens are from the same locality, have the same wing expanse, 19-20 antennal joints, and a spur length of ·67 and ·74. These are smaller than typical *M. crassiorella*, and have only 20 antennal joints at most (19 I think, but have only counted them on the specimens), so that they seem to be too distinct a race to be sunk as a var. of *M. crassiorella* (anterior tibia, pl. iv., fig. 30).

(4) *M. subflavella*, Mill.—This is a Riviera species described by Millière, and he separates it from others by colour, and I think correctly, an exception in this matter to prove the rule. He very strongly insists that the yellowish-brown colour, with rather darker hind margin, is definitely so in freshly emerged specimens. If a variety it could only be of *M. crassiorella*, from which it differs further in being smaller and broader and shorter winged. It agrees with *M. crassiorella* in having 24 antennal joints and a tibial spur length of ·72, expanse 12mm.-13mm. (*vide*, pl. iv., fig. 36, anterior tibia).

(5) *M. edwardsella*, Tutt.—These are four specimens bred by Mr. Tutt from larvæ collected at Aix-les-Bains by Mr. Stanley Edwards and myself. They much resemble *M. subflavella*, but are smaller, *viz.*, 11mm. in expanse, and have only 20 joints to the antennæ; the tibial spur length is ·70. The specimens are not in good condition, and rather suggest *B. reticulatella* in the looseness of their scaling, but this may be the result of want of condition. There may be some grounds for suspecting that these are Bruand's *M. saxicolella*. The latter is,

however, defined as expanding 15mm., and doubtless it also as well as *B. reticulatella* has the "cellula intrusa," which *M. edwardsella* is without. Its coloration and darkening towards the hind margin differentiate it from *M. mitfordella* and associate it with *M. subflavella*, from which it differs in size and number of antennal joints (*vide*, pl. iv., fig. 37, anterior tibia).

The great "*casta* group," with a spur length of ·77-·81, is, perhaps, the most puzzling and difficult of all. I incline to consider them all as one species with a number of local races and varieties. This certainly gets over the great difficulty of saying what many intermediate forms should be called. On the other hand, it is probable from the specimens I have examined that each colony of the species is fairly well-defined, and does not present, except in rare aberrations, specimens agreeing with other varieties, and it is evident that if this is so it must be largely a matter of individual predilection rather than anything else whether each such race is to be called a species or not. The only ground for doubting my conclusion to call them all one species is that there is also some ground for believing that the *nitidella* and *intermediella* forms do occur together in some localities, and yet maintain themselves as separate races. This certainly requires further investigation. I may say that I have put names to these forms without sufficient certainty that I am right as to the use of the names *nitidella* and *intermediella*. If I am wrong this can be put right, but I have assumed *nitidella* to be the small form, which Bruand thought he was dealing with under the name *roboricolella*, but with which he unfortunately mixed some *Prontia betulina*, and so gave an account which is incorrect whichever species we apply it to.

Fumea casta.—The name *casta* appears to cover the great mass of the Fumeas in British collections, called often, with much apparent capriciousness, *roboricolella*, *nitidella*, *intermediella*, and even *crassiorella* and *crassicolella*. The definite character that unites all the forms is a length of tibial spur of from ·77 to ·81. The antennal joints differ from 16 to 18 and 20, and the expanse from 9mm. to 15mm. There is a good deal of variation in wing form, generally there is a good breadth basally by the inner margin commencing at the base with a deep rounded lappet, and the inner and costal margin making some approach to parallelism. But not a few show a considerable approach to the form of *M. mitfordella*. It is very possible that by measuring the spurs of a number of such specimens some would prove to be really *M. mitfordella*. The several forms differ chiefly in size, but also in the number of antennal joints:

a. ab. *minor*.—Exp. al. 9mm.-10mm., antennal joints 18, wings often more diaphanous than type. I have called this an aberration rather than a variety, as it occurs in odd specimens in different collections, and is usually probably a starveling form rather than a distinct race.

β. var. *nitidella*.—Exp. al. 11mm.-12mm., antennal joints 18. This is a very definite race, and appears to be the most common and widespread form. I am by no means prepared to assert that this form is not a true species and distinct from the next form, only, if so, I cannot divide them with even approximate confidence (anterior tibia, pl. iv., figs. 46-47).

γ. var. *intermediella*.—Exp. al. 13mm.-14mm., antennal joints 18-20. This is rarer than the last species, and is, in places, apparently a distinct race, in others merely an aberration of *nitidella*. Some of the largest specimens have only 18 antennal joints and some of the smallest 20, so that I feel unable to divide the forms *nitidella* and *intermediella* into two distinct species, defined as *nitidella*, 18

joints, *intermediella*, 19-20, though I am prepared to grant that this may be so, and that the variations in size are such as to make them overlap in this feature. We found, however, in *crassiorella* a considerable variation in the number of antennal joints, which it seemed impossible to use as a means of dividing that species. In *nitidella* and *intermediella* the antennæ present indications of being in process of altering the number of joints in the manner I have described in speaking of the antennæ (anterior tibia, pl. iv., fig. 44).

δ. var. *bowerella*.—This is a very definite form in one special respect. I have met with it only in a certain number of specimens bred by Mr. B. A. Bower from Kentish localities. Its general facies is much that of *nitidella*, if anything rather smaller, 11mm. in expanse, spurs ·77. The difference is in the antennæ; instead of having 18 joints it has only 16 or 17. The antennal pectinations are the same length as in so many other species, *viz.*, ·50mm., but they are relatively to the antennal joints very short, *i.e.*, the antennal joints are long, *viz.*, ·240mm., a very constant group of *nitidella* having them only ·202mm. in length, another specimen ·210mm., and the longest I have found in any other specimen was ·227 in a large *intermediella* (anterior tibia, pl. iv., fig. 48).

Fumea scotica (?var. ε).—This is a very large form, and of very robust appearance, so that it is very difficult to resist the conclusion that it is a distinct species. It agrees with *F. casta* in having 19-20 antennal joints and a spur length of ·78, but in size it rivals *M. crassiorella*, being 13mm.-15mm., and in apparent solidity and robustness it exceeds it. This form comes from Rannoch and Sutherlandshire. One cannot avoid wondering here if this is not the same as *norvegica*, Heyl., a Norwegian species which Dr. Heylaerts finds to be identical with a south French form. Dr. Heylaerts is, however, very definite that not only the French form, but the Norwegian one also, possesses the "cellula intrusa." This, of course, places *norvegica* in the *reticulatella* group and widely apart from the specimens with which we are here dealing (anterior tibia, pl. iv., figs. 43, 45).

Fumea germanica, n. sp.—There remains the species with spurs of ·84 to ·86. This I propose to name *F. germanica*, as the specimens were sent me by Herr Voelschow, some as *intermediella*, some as *affinis*. They agree, however, perfectly, and are all one species. It may be that this is generally known in Germany as *affinis*. It is very different, however, from the *M. affinis* sent me by Staudinger, and described by Hofmann, which I have already dealt with as closely allied to, if distinct from, *M. crassiorella*. We may describe it as follows:

Fumea germanica, n. sp., does not appear to be distinguishable in general appearance from *F. casta* var. *nitidella*, its expanse is 12mm., it has 19-20 joints to the antennæ, and a length of tibial spur which is far in excess of any other species I have examined, and obvious to the unassisted eye when compared with *F. casta*, *viz.*, ·84 to ·86. Other *intermediella* sent me by Herr Voelschow are referable to *F. casta* (anterior tibia, pl. iv., fig. 49).

For the opportunity of making this examination of the Fumeid species I am indebted to a number of English entomologists, who have entrusted me with many specimens belonging to the forms and varieties I have noted. Among them I may mention Messrs. A. Bacot, E. R. Bankes, C. G. Barrett, B. A. Bower, Briggs, the Rev. C. R. N. Burrows, Messrs. J. A. Clark, C. W. Dale, W. H. B. Fletcher, A. H. Hamm, Dr. Mason, Messrs. Montgomery, L. B. Prout, N. Richardson, S. Stevens, J. W. Tutt, F. G. Whittle, to all of whom my best thanks are due.

Explanation of Plate IV.

Neuration (not to same scale):

Fig. 1. Luffia lapidella *aberr.* (f.w.)
2. Luffia lapidella (f.w.)
3. Luffia lapidella (h.w.)
4. Masonia crassiorella (f.w.)
5. Masonia crassiorella, *aberr.* (f.w.)
6. Masonia crassiorella (h.w.)
7. Bacotia sepium *aberr.* (f.w.)
8. Bacotia sepium (f.w.)
9. Bacotia sepium (h.w.)
10. Bacotia sepium *aberr.* (h.w.)
11. Bruandia reticulatella (f.w.)
12. Bruandia reticulatella (h.w.) (frenulum broken)
13. Proutia betulina (f.w.)
14. Proutia betulina (h.w.)
15. Proutia eppingella (f.w.)
16. Proutia eppingella (h.w.)
17. Fumea casta (f.w.)
18. Fumea casta (h.w.)

Anterior tibial spur (enlarged 23 diameters).

Fig. 19. Bankesia staintoni (·38)
20. Solenobia wockii (·48)
21. Taleporia tubulosa (·40)
22. Luffia lapidella (·50)
23. Bacotia sepium (·50)
24. Proutia betulina (·69)
25. Proutia eppingella (France) (·68)
26. Proutia eppingella (Epping) (·68)
27. Bruandia reticulatella (·56)
28. Bruandia *var.* obscurella (·59)
29. Bruandia *var.* obscurella (·57)
30. Bruandia comitella (·64)
31. Masonia crassiorella (England) (·70)
32. Masonia crassiorella (Cannes) (·66)
33. Masonia crassiorella (Cannes) (·63)
34. Masonia crassiorella (Germany) (·67)
35. Masonia affinis (·70)
36. Masonia subflavella (·70)
37. Masonia edwardsella (·71)
38. Masonia hibernicella (·67)
39. Masonia mitfordella (·70)
40. Bijugis bombycella (·53)
41. Bijugis proxima (·56)
42. Bijugis pectinella (·62)
43. Fumea scotica (Rannoch) (·81)
44. Fumea *var.* intermediella (Portland) (·80)
45. Fumea scotica (Sutherland) (·78)
46. Fumea casta (·81)
47. Fumea casta (·81)
48. Fumea casta (·77)
49. Fumea germanica (·88)
50. Canephora unicolor (·88) (enlarged 8 diams.)
51. Pachythelia villosella (·88) (enlarged 8 diams.)

Explanation of Plate V.

The antennæ shown in this plate are:

Fig. 1*a-b*.—Portion of antenna of *Luffia lapidella* (×60 diam.). There are two pectinations to each joint arising near its base and rather ventrally than laterally. The pectinations are slightly clubbed and clothed on all aspects with sense-hairs. The scaling is confined to the shaft on its dorsal aspect, four rows of scales not very strictly arranged to each segment or joint.

Fig. 2.—Portion of antenna of *Bacotia sepium* (×60 diam.). Agrees with preceding, in arrangement of scales and hairs, the pectinations are more nearly lateral but still nearer the venter than opposite each other; the pectinations are clubbed so as to give a special square aspect to the divisions of the antenna.

Fig. 3*a-b*.—Portion of antenna of *Proutia betulina* (×110 diam.). Similar distribution of hairs and scales as in the two preceding, the pectinations are longer and have little or no clubbing.

Fig. 4.—Portion of antenna of *Fumea casta* (×70 diam.). The antenna is very like the last in general form, but has scales instead of hairs along the whole dorsum of the pectinations, making them look thicker and even somewhat clubbed, due, however, to the scales being rather more abundant apically.

Fig. 5.—Portion of antenna of *Acanthopsyche opacella* (×70 diam.). The pectinations are much longer and more flowing than in last. In *Psychinae* such pectinations are scaled (often hairscales) as in *Fumea*. In *Acanthopsychinae* such scaling has been lost and the dorsum is naked except for an occasional tactile bristle.

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

The palm as a migrant among butterflies must, however, in the Palæarctic region, be awarded to the cosmopolitan *Pyrameis cardui*, which is distributed throughout almost the whole of the eastern and western hemispheres. It abounds almost every year in the sub-tropical countries of the Old World, and hence vast flocks appear to disperse themselves into the Palæarctic regions, as well as to the south. In Britain it sometimes appears in successive years, and is rarely absent for more than three or four years in succession. Yet, with the exception of an occasional individual, the autumnal progeny that results from the spring immigrants fails to hybernate, and the species cannot establish itself permanently in this country. The autumnal-bred specimens, undoubtedly following the habit engendered in the subtropical home of their parents, lay their eggs (which quickly hatch) and attempt to produce another brood, which is killed off as larvæ by the early frosts, and thus bring about, as does *Colias edusa*, their own extermination.

Before discussing the migration of *P. cardui* it may be well to call attention to the apparent similarity of the conditions that cause the migration of this species and *Plusia gamma*. Not that migrations of these species do not take place independently, but their repeated simultaneous occurrence is worthy of remark. To run through this connection historically would be largely a waste of time, and the following records must be taken as examples of many others. Before, however, giving any records, we may note that *P. gamma*, with us, has no regular season; it has been seen from January to December in the imago state, and in its abundant years when a late brood of imagines comes out well into October, the larvæ from these feed up all the while food is obtainable, and die off or pupate (according to the severity of the winter) in late November and December. Under any conditions their continuous-broodedness results in their repeated destruction, and here it falls in the same category as our two Coliads, *Pyrameis cardui*, &c. In 1879, one of the wettest and coldest summers of the century, there was a marvellous incursion of both species in this country in May. Thus Cambridge records that in the Bloxworth district both species were unusually abundant in May and June, and that, in August, they were in the greatest profusion, *P. gamma* rising from the flowers when disturbed "in swarms." Slater records that on August 13th the sea at St. Leonards was scattered over with the moths that were being washed up in lines on the shore, and states that no one seems to have observed whether the moths had come from France, or had been drowned in attempting to leave England. Carrington observed that the sandhills on the Essex coast were infested with the species, the numbers being so great as "almost to pass description." McRae states that at Bournemouth *P. cardui* was in August swarming in thousands, and *P. gamma* in tens of thousands, whilst it was quite evident that the autumnal abundance (arising from the spring immigration) was not confined to England, for Cox records that near the Kursaal, at Ostend, *P. gamma* was in shoals, whilst *P. cardui* was flying by hundreds up and down the streets and on the barren sandhills, whilst Thwaites notes that in Saxon Switzerland the two species were as

abundant as in England. *P. cardui* literally swarming about the cherry and other fruit-trees planted by the road-side, whilst walking through the clover fields caused them to rise in clouds. More abundant still was *P. gamma*, which was in enormous numbers and almost put out the lights at night if the windows were left open. Snell reports that they were equally abundant in the Western Highlands as in the south of England.

Hall noted *P. gamma* as exceedingly abundant at Deal, in the spring of 1883, and also *P. cardui*, but whilst the descendants of the former were in great force in the autumn, those of the latter were rather rare, possibly due to the bad weather experienced in June in that district. Barrett notes that in Pembrokeshire *P. gamma* and *P. cardui* had been as abundant as elsewhere in 1879, that in the following years they were absent or very scarce, and that although not a single *P. cardui* was observed in the autumn of 1882, in May, 1883, *P. gamma* suddenly appeared in swarms, and ten days later *P. cardui* similarly was noticed in great abundance. The *P. gamma* were more slate-coloured than those bred in the country, and the specimens of *P. cardui* also were pale. Here, too, as at Deal, *P. gamma* was abundant in the autumn, but *P. cardui* rare, owing, also, to the bad weather in June. In 1889 Carrington observed that, previous to June 1st, he had not seen a single *P. cardui* or *P. gamma*, although he had been regularly on the look-out, but, on that day, one *P. cardui* was seen, and by the 3rd hundreds of the species were everywhere as also *P. gamma;* the numbers gradually lessened during the week, probably due to dispersal. A steady south-east wind had been blowing for three days previous to June 1st. Many active collectors will remember the great influx of both species in 1894. Among many other observers Walker notes (*Ent. Mo. Mag.*, xxx., p. 162), in June, 1894, the sudden appearance of *P. cardui* and *P. gamma* in considerable numbers. On the thistles, in bloom on the sea-wall in the Isle of Sheppey, on the morning of June 17th, he observed two or three specimens of *P. cardui* on each flower, and, in the hayfields, a little way inland, *Plusia gamma* was equally common, getting up out of the grass as one walked along the path. The specimens of both species were worn and faded but not apparently torn or broken, and their appearance suggested a considerable immigration, whilst during the preceding autumn *P. cardui* had been rare, and *P. gamma* less common than usual. No examples had been seen previously to that date on which they were first so abundant, except a single *P. cardui* at Chatham, on June 14th. Bankes observes (*loc. cit.*, p. 210) that he noticed the sudden appearance of *P. cardui* in Purbeck, in abundance, on June 4th of the same year, whilst the preceding year it was entirely absent from the neighbourhood.

As we have already stated, these are only isolated examples of dozens of similar records that are to be found scattered throughout our magazines. No one has yet attempted to explain the conditions that usually result in the immigration of these very different species at the same time, and apparently under identical conditions.

ORTHOPTERA.

Macropterous variety of Xiphidium dorsale, Latr.—I captured what Mr. Burr has provisionally determined as a macropterous variety

of *Xiphidium dorsale*, on the Essex coast, not far from Clacton-on-Sea, one hot day last August. My elder son and I were together at the time, looking out principally for *Sympetrum flaveolum*, of which he took one female. The *Xiphidium* presented a very strange appearance on the wing, and on netting it I found it was something quite new to me; and not being aware that *X. dorsale* was only known as a micropterous insect, I thought it was probably a fully developed form of that species, its very long antennæ and general appearance pointing to that conclusion. Having boxed it, after showing it to my son, we were moving on, when we disturbed another. This was also captured, but as its antennæ proved defective, we turned it down again, and somewhat to our disappointment, could meet with no more. I have frequently seen *Xiphidium dorsale* in the locality, but had not previously found a macropterous specimen.—W. H. Harwood, Brooklyn Villas, Station Road, Colchester. *March 23rd*, 1900.

Xiphidium dorsale, Latr., var.?—Mr. W. H. Harwood has kindly submitted to me for identification a curious specimen of *Xiphidium*, captured near Clacton-on-Sea, in August, 1899. At first glance it might be taken for *X. fuscum*, Fab., but a closer examination shows that it is not that species, but apparently a macropterous form of *X. dorsale*, Latr. This is a species which is normally micropterous, that is to say, the organs of flight are abbreviated, though developed. They are incapable of flight, and the wings abortive, but the elytra are large enough for purposes of stridulation. In the ♀ they are about half the length of the undistended abdomen, and reach about half the length of the posterior femora when these limbs are stretched out backwards; in the ♂ the elytra are somewhat longer, usually almost reaching the apex of the abdomen. But in this specimen both elytra and wings are amply developed, and are capable of bearing the insect upon the wing. The specimen before me is set with the wings expanded, but when closed they would certainly reach well beyond the posterior femora, if these were extended backwards. The length of the elytra is given by Brunner as 6·5mm.-8mm., but in this specimen they are 18·5mm.; Brunner does not give the length of the wings, which are normally abortive, but in this specimen they are 19·5mm. In development of the wings and elytra this example closely resembles *X. fuscum*, Fabr., and *X. thoracicum*, Fisch. de W., but it may be distinguished by characters which will be given below. It agrees entirely in structure with *X. dorsale*, except in that the elytra and wings are fully developed, and in the form of the supra-anal plate of the male. In *X. dorsale* this is sulcate in the centre, slightly depressed and bituberculate on the hinder margin; in this specimen, the supra-anal plate is flat, not depressed, and bituberculate, but not sulcate. This is an important character, and may possibly prove to be sufficient for the basis of the erection of a new species. Without seeing the female, however, it would be rash and premature to offer a new name, as further characters, confirmatory or otherwise, may be found in the other sex. For the present, it must, therefore, be regarded as a macropterous form of *Xiphidium dorsale*, Latr. I am not aware that this form has been before recorded, and it is certainly a rarity. Mr. Harwood's statement, that a second specimen was seen, is interesting, as it shows that it may be a local permanent race, and that it deserves to be called a variety rather than an aberration. Macropterism in

normally micropterous species is by no means an uncommon phenomenon in the Locustodea, but it has not been before recorded for the species in question. Apart from the development of the organs of flight, *X. dorsale* may be distinguished from *X. fuscum* and *X. thoracicum* by the following points:

Femora (posterior) armed with two dark minute teeth near the apex on the outer margin of the inferior sulcus. Ovipositor quite straight	*X. fuscum.*
Posterior femora with 3-4 small dark teeth on the outer margin of the inferior sulcus near the apex. Ovipositor very slightly curved	*X. thoracicum.*
Posterior femora with no teeth whatever on the under or upper surface. Ovipositor incurved..	*X. dorsale.*

In this specimen the femora are totally unarmed. If the female differs at all from typical *X. dorsale* in the form of the ovipostor, it should be a new species.

X. thoracicum is a rare meridional species, but *X. fuscum* is common throughout south central Europe.—Malcolm Burr, F.Z.S., F.E.S., Dormans Park, East Grinstead.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Forcing Callimorpha hera larvæ.—As so many have expressed surprise when I have informed them that I had full-fed larvæ of *Callimorpha hera* by March 1st, I venture to give the following rough notes on the forcing of this insect, thinking they may be of interest. Dr. Cassal, of Doncaster, very kindly sent me a nice lot of larvæ early in January (then still hybernating), and I am happy to be able to say the first of them spun up on March 22nd. By February 23rd about half a dozen larvæ were in the last stadium, and by March 1st there were about 100 full-fed, or nearly so. The reason why I have been able to get these larvæ so forward is owing, I feel sure, to their having been kept in a cupboard which was generally of the temperature of about 65°F.-70°F., the heat being obtained from the kitchen chimney, which passes up behind the cupboard. The very young larvæ were kept in glass jars, and were transferred to breeding cages when nearly full-fed—the food-plant (groundsel) being planted in the cages. It is the general idea that the larvæ of the Arctiids specially require plenty of fresh air and bright sunshine, but I am rather forced to think otherwise, because my larvæ have for the greater part of their existence been kept in this cupboard in total darkness. The larvæ have been very easy to rear, and out of about 200 certainly not more than three dozen have died—the deaths occurring mostly during the earlier moults, and perhaps from a little overcrowding when in the glass jars—they appeared, however, to like crowding together in the corners of breeding-cages. By April 7th, the whole had spun up. At a meeting of the North London Natural History Society, held on March 15th, Mr. Lane exhibited a few of the full-fed larvæ. For a short time, when it was difficult to get groundsel, owing to a heavy fall of snow, the larvæ were fed on *Campanula trachelium* (Canterbury Bell), to which they took very well.—Chas. B. Antram, Addiscombe, Croydon. *April 10th*, 1900.

Erratic emergence of Abraxas grossulariata.—I have had recently an experience in breeding *Abraxas grossulariata* which is quite novel to me. On October 30th last, I found a number of larvæ feeding

on gooseberry, and red and black currant bushes, in an old neglected garden in this city. Judging from the denuded bushes there must have been a large number of larvæ, most of which had disappeared. Amongst those left there were a few which appeared to be from three-fourths to nearly full-fed. I took eight of these and placed them in a breeding-cage in a cold room, no fire, giving them such scanty food as I could. Three of the larvæ pupated between November 7th and 10th; one of the resulting imagines emerged on December 7th, 1899, the other two on January 2nd, this year. The first was a male, and the others females—all were small and rather darker than the type, though not sufficiently so, to be of any use as varieties—the rest of the larvæ are still hybernating.—T. Maddison, F.E.S., South Bailey, Durham. *March 22nd*, 1900.

Emergence of Stauropus fagi in November.—It may be well here to note that in November last, two imagines of *Stauropus fagi* emerged from pupæ of the year.—R. B. Robertson, Forest View, Southborne Road, Boscombe.

Erratic emergence of domesticated Spilosoma lubricipeda var. radiata.—Late in October and during November last I bred a few specimens of *Spilosoma lubricipeda* var. *radiata*. The emergence of this species in confinement appears to be very erratic, as from a brood of eggs hatching in early June about half the brood emerged in August, a few, as already noticed, in late autumn, whilst the remainder are now in pupa, and will probably emerge in the spring.—A. W. Mera, 79, Capel Road, Forest Gate, E.

Habits of Poecilocampa populi.—*Poecilocampa populi* is not uncommon in the larval state at Bishop's Wood, near Selby. I have found it singly in the daytime whilst searching for insects at rest, usually, then, in the cracks of the bark of oak and poplar. Searching in early June, 1896, I found eight or more larvæ on the trunks; they appear to be nocturnal feeders, commencing to move before twilight (at least they did so in captivity) and eat oak, sallow, poplar, &c. Feeding them in a large flower-pot, they pupated during the third week of June, on the side just above the earth, using some of the light soil to form the cocoon, which, when completed, was of an earthy colour, mixed up with fine particles of the pot on which the cocoons were built. Unfortunately I lost three of the cocoons, but the four I had left had all produced imagines by November 8th, and were all beautifully marked females. I once took an imago at light at Sandburn, and frequently also at the lamps in this city.—S. Walker, F.E.S., 15, Queen Anne's Road, York. *April 27th*, 1900.

Eggs of Lepidoptera.—*Erebia ceto*.—A single egg laid at the junction of a small lateral leaf-bearing stem with a larger shoot of *? Vaccinium myrtillus*. It is of large size about 1mm. along vertical axis by ·9mm along horizontal axis. The horizontal section is circular, the vertical one a short oval, flattened so much at top, base, and sides, that it might almost as correctly be called the section of a cylinder. It is almost equally flattened at base and micropylar ends, but is a trifle flatter and broader at base. There are seventeen coarse, roughly marked, longitudinal ribs, but they are wanting in clearness and sharpness of sculpturing, and give an impression of a fading, or not yet fully developed character. Faint traces of cross ribbing can be discerned (with 1″ objective), they show clearest on ridge of longitudinal

ribs. The longitudinal or vertical ribs end at the shoulders of egg. A slightly marked, shallow, but distinct, cell sculpturing extends outwards from micropyle to shoulders. Surface smooth. Colour, opalescent white, spotted with rather large dark crimson or magenta spots, each of which is formed of a collection of irregular dots. [Described July 27th, 1899, from an egg received from Mr. J. W. Tutt.]—A. Bacot.

Cidaria testata.—Large, considering the size of moth, laid singly or in twos and threes. ·80mm. in length by ·65mm. in width, and about ·40mm. in thickness. In shape an oval, rather larger at one end than the other, the small end flattened, giving it the appearance of a deep bag with a flat top. This flattened end is the micropylar one. The surface is very finely but deeply reticulated or pitted. Its colour, shortly before hatching, is of a dull pale flesh, with dark rod-like mottlings, and the egg has a distinct bloom on it. The shape of the egg suggests that it is on the same line of development as those of *Ennomos*, but whether it really belongs to the same stirps, or is only a parallel development, I am not prepared to say. [Described August 11th, 1899.]

Nonagria geminipuncta.—The eggs were laid loosely in a chip box, but judging from their shape I should expect them to be laid in the crevices at the junction of a leaf to the stem of a reed. They are of a pale cream colour, and are shaped like a thick roughly circular disc, with a milled edge (the last remnants of the Noctuid ribbing), giving them the appearance of a clumsily made coin. About 1·125mm. in diameter by ·3mm. in thickness (length of micropylar axis). The apex and base are covered by a faintly marked cell-network or reticulation, and the micropylar rosette, though faint, is still clear. Round the rim are a series of 50 to 52 vertical ribs. These ribs are faintly continued for a short distance over the edges on the flat top and bases. Surface smooth and glistening. [Described August 19th, 1898, from ova received from Mr. W. Woodward.]—A. Bacot.

Notes on the early stages of Laria v-nigra, Fabr.—Ova.—The eggs of this reputed British species are exceedingly curious objects.* In shape they are thickish discs 1mm. in diameter, and ·44mm. in thickness (the latter measurement being the length of the micropylar axis). The surface is covered by a delicate and beautifully clearly marked cell reticulation on the top, but only faintly marked towards the base. The micropylar rosette is very clear and regular, the cells being much squeezed together and elongated. In colour the eggs are semitransparent yellow, gradually darkening during development to livid, their tint just before hatching, which occurred about July 8th. The larva eats its way out at the side leaving the top and base intact. Larva (First instar).—*Head* polished black, rounded, and of considerable size. *Body* of usual Liparid shape, but somewhat more slender and lengthy than is usual in the genus. Thoracic segments wide and somewhat flattened, abdominals smaller and tapering gradually backwards. The prothorax bears a small scutellar plate. The coloration roughly speaking is very like that of *Lymantria monacha*. Division of segments deeply cut. The 5th abdominal is pale coloured, and the 7th is also

* The only other lepidopterous egg I have examined that approximates to this in shape is that of *Nonagria geminipuncta*, which in general appearance is like a thick clumsily made milled coin.

rather light. *Hairs* long, tapering, and thorny—some dark, others light. *Tubercles*, dorsal abdominal tubercles are single-haired, i inner, bears a small pale hair, ii outer, bearing a larger dark hair ; iii, supra-spiracular, is a cone-shaped tubercle bearing three or four hairs. The subspiraculars are difficult to determine in so small and hairy a larva, but I think they are consolidated [Unfortunately I was unable to complete the above fragmentary notes of the first larval stage or to take any notes on the later ones, owing to the large amount of attention required by some other species.]. Habits of Larva.—It is worth mentioning, however, that the larva is possessed of considerable powers of jumping when startled or touched. With a sudden jerk it flings itself into the air covering a distance many times its own length. This habit is present during several instars. In the second it is even more noticeable than in the first ; the distance covered being some two inches or more. But as the larvæ grow larger they become less active, and require more stimulus to start them, the jump being proportionally lessened. In jumping the larvæ seem to be able to turn round or over while in mid-air, as they always alight with their heads facing the cause of the stimulus (with my larvæ usually a small camel hair brush or pencil). I was not, however, able to detect the action which enabled them to jump owing to the rapidity of their movements. This habit is probably of great use to them in evading the attacks of birds, hymenopterous or dipterous parasites, spiders, &c. The larva hybernates when about $\frac{1}{2}''$ long, its habit being somewhat similar to that of *Notolophus gonostigma*, spinning a silk web or pad on a leaf as if about to moult.—A. Bacot, 154, Lower Clapton Road, N.E.

The larva of Oiketicus omnivorus, Fereday.—Size: 23mm. long, 6·25mm. in thickness, at middle, tapering to each extremity. Colour: Head, and thoracic segments spotted and streaked with brown on a cream-yellow ground colour. The abdominal segments are dull brown, except at the sides where the mid-lateral swellings on each segment form an irregular cream coloured line. Structure (under one-inch objective).—*Dorsal* and *Lateral views : Head*—The six ocelli are arranged in "crescent" at the lower anterior area of lobe ; below the crescent are two hairs, within it are three hairs, and above it are two hairs, besides which there are hairs along the frontal portion of lobes and on clypeus ; antennæ have a broad, white, fleshy base, a narrow white second joint, a longer brownish (chitinous) third joint, and from the latter project two terminal processes, a long bristle, and a small joint which likewise gives out one terminal process, and a two-jointed process. The outer maxillary palpus is terminated by a blunt joint, and there are four inner processes. The labial palpi are in front, and rather more than half the bulk, of the spinneret, which is not nearly so slender nor so long as in the *Hepialidae* for instance. *Prothorax :* The whole dorsal and lateral area consists of a smooth hard shield, no definite scutellum is distinguishable, on the dorso-lateral area are two single-haired tubercles, representative of the trapezoidals, but reversed in position, *i.e.*, the anterior are remote from, the posterior close, to the median line ; on the anterior lateral edge of segment is a marginal series of four hairs, with two others inner to these at the lower end of series, thus there are three hairs below the spiracular position, and anterior to it. The spiracle is a raised mahogany coloured

oval rim (transverse) on the posterior area of the segment, a little below the middle. In the centre of the lateral area, above the spiracle, is a single hair. Above the legs is a large tubercle with two hairs. At the base of the legs are several hairs, but the first chitinous joint appears to be destitute of hairs, whereas the remaining joints have three or four hairs at the outer edge of each. The legs on each thoracic segment are the same. *Meso-* and *Metathorax*—I cannot find hairs representative of trapezoidals, but there are, one above another, two hairs; these, with two single lateral hairs, form a disconnected marginal series on the anterior edge of the segment. The lateral swellings (? tubercles) consist of three principal and some minor raised areas; the upper (supraspiracular) swelling has two hairs, the middle is without hairs, and the third corresponds with that above the legs on the prothorax, and has two hairs; there is also a small anterior intersegmental tubercle with one hair. *Abdominal segments.*—All the hairs seem to rise from simple rings, not from chitinous (?) areas, as in most larvæ with which I am acquainted, thus the subspiracular tubercles (iv, v) can only be regarded as coalesced, in that they rise separately from a common swelling (? segmental area, not tubercle) and not a common chitinous base. On all the segments the trapezoidals are reversed from the normal position, *i.e.*, anterior remote and more lateral, posterior close and more dorsal. The supraspiracular tubercle has only one hair, though the ring or scar of a second hair is noticeable. The spiracle is circular, and on the lower anterior area of the supraspiracular swelling. Below is the subspiracular swelling with two hairs, an anterior tubercle with one hair, and a subventral swelling with two hairs on the 1st and 2nd abdominal segments. On 3, 4, 5, 6, the subventral swelling becomes a proleg (apparently two-jointed) with two hairs at the base; the tubercles on 7 and 8 are arranged as on 1 and 2; on 9 the posterior trapezoidal and supraspiracular hairs are on the posterior edge of the segment, as are the subspiracular, which, however, still rise from a common swelling; below these are two single hairs. On 10, above the anal orifice at either side, are four single hairs, two below, and two at base of claspers. *Ventral view.*—The arrangement of the hooks of claspers is a semi-circle on each, incomplete on inside, consisting of one row of strong hooks only. On the prolegs it is a transverse oval, incomplete on the inner side, a single row of hooks, much stronger on the anterior side than they are on posterior side of oval. At the base of each leg on thoracic segments, is a single hair; this also is present on all the abdominal segments. Under a one-quarter inch objective the skin appears simply rough, about as much so as an ordinary hen's egg. I could detect no trace of minute hairs, such as are present on some larvæ, but in the spaces between the lateral swellings the skin has a very fine reticulation.—A. Quail, F.E.S.

NOTES ON COLLECTING, Etc.

Sesia cynipiformis and S. culiciformis near Croydon.—During the past week I have taken about 50 full-fed larvæ of *Sesia cynipiformis*, and during March about the same number of *Sesia culiciformis* larvæ. Both insects are fairly common not far from Croydon.—Chas. B. Antram, 54, Elgin Road, Addiscombe, Croydon. *April 10th*, 1900.

Aventia flexula and Hypena rostralis.—I have just been reading the two most recent parts of Mr. Barrett's work on *British Lepidoptera*. In part lxvii, he says of *Arentia flexula*, that "it is not to be attracted by flowers or other sweets." On July 27th, last year (1899) I took a specimen at sugar here in my garden, and seem to recollect having seen this species at sugar before. In part lxviii, Mr. Barrett, treating of *Hypena rostralis*, gives *Humulus* (hop) as its only food-plant, so also do Stainton and Meyrick. It is quite common here, where there is no hop-vine anywhere near, and I have taken it under similar circumstances in several other localities.—(Rev.) G. H. Raynor, M.A., Hazeleigh Rectory, Maldon, Essex. *April 3rd*, 1900. [Mr. Prout has also taken one *A. flexula* at sugar, at Sandown.—Ed.]

Females of Stilbia anomala at sugar.—In August last, in the New Forest, I took, with a brother entomologist, a female *Stilbia anomala* at sugar. We saw no males at all, although we searched for them at dusk. In South Devon, in 1897, I also took two females at sugar? Has anyone ever taken a male in this way?—F. C. Woodforde, Market Drayton, Salop.

Query—What is the food-plant of Oxyptilus lætus (distans)?—I have found a locality for this species near this town, and should like to breed the insect, but cannot guess the pabulum of the larva. Is the food-plant known?—E. A. Atmore, F.E.S., King's Lynn.

Apamea ophiogramma and Thecla w-album near King's Lynn.—I have recently seen a specimen of *Apamea ophiogramma* taken by a beginner here, also a fine bred series of *Thecla w-album*, the larvæ of which were beaten from elms near the town last season.—Ibid.

Mimæseoptilus loewii and Depressaria douglasella near Southend.—At Shoeburyness I captured, between August 12th-22nd, last year, in a field in which there was a great deal of *Erythræa centaureum*, three specimens of a plume which I now recognise as *M. loewii* (*zophodactylus*). On a shed in the same field I boxed a specimen of *Depressaria douglasella*. An example of *Camptogramma fluviata* was netted among reeds at Pitsea, on September 9th, last.—F. G. Whittle, 3, Marine Avenue, Southend.

Distribution of Amorpha populi in western Scotland.—With reference to Mr. Arbuthnott's notes (*anteà*, p. 31) on the occurrence of *Amorpha* (*Smerinthus*) *populi* in the west of Scotland, the species not only occurs, but is very common all over the district. Even within the boundaries of the city of Glasgow, large numbers of the larvæ have been obtained, and the insect successfully reared. Mr. E. C. Eggleton reared a large brood from ova obtained in the West End Park. Mr. A. Somerville obtained the species in Hill-head, I have also taken the larvæ from poplars in Pollokshields, and the perfect insect has repeatedly been brought to me by young friends. The larvæ, too, often occur on willow. I append a few localities for the Clydesdale district, which will give some idea of how generally the insect is distributed in south-west Scotland:

Lanarkshire: Cambuslang (A. A. D.), Lighthill (G. W. O.). Stirlingshire (portion): Fintry (E. C. E.). Dumbartonshire: Milngavie (G. W. O.), Bonhill (J. S. R. M.), Garelochhead (T. J. H.). Argyleshire (portion): Dunoon (T. C.), Kilberry (Miss M. L. C., *Ent.*, vol. xxviii., p. 20, not in Clydesdale). Bute: Arran (W. S. and J. J. W., *Ent.*, vol. xv., p. 250). Renfrewshire: Pollokshields and Crookston (A. A. D.), Paisley (W. S. and J. D.), Johnstone (W. W.). Ayrshire:

Kilmarnock (G. R.), Ayr (W. C. S. F.), Ballantrae (A. A. D.). Wigtonshire (portion): Stranraer (A. A. D.).
—A. Adie Dalglish, F.E.S., 21, Princes Street, Pollokshields, Glasgow. *April* 10*th*, 1900.

Spring insects.—Until March 13th I had only taken one *Nyssia hispidaria* and five male *Amphidasys strataria* (in the trap). *Hybernia marginaria* has been fairly common, but *H. leucophaearia* very scarce, as also *H. rupicapraria*, whilst it has been quite the worst season for *H. defoliaria* I have ever known. *Phigalia pedaria* has been represented so far by six or seven, as against dozens in other years, and only one ♂ *Larentia multistrigaria* has, as yet, appeared. Neither *Asphalia flavicornis* nor *Diurnea fagella* has yet appeared, and the sallows are only just budding. The season is very backward so far.—E. F. C. Studd, M.A., Oxton. *March* 13*th*, 1900.

At Selby the season has been, to date, very backward, and though I have been out on most nights, when there has been a probability of doing anything, I have taken nothing worth setting. *Hybernia rupicapraria* has been, and still is, fairly plentiful, whilst *H. marginaria* is also getting well out, but at present no good aberrations have turned up.—(Rev.) C. D. Ash, M.A., Selby. *March* 16*th*, 1900.

PRACTICAL HINTS.

Field Work for May and June.

By J. W. TUTT, F.E.S.

1.—The imago of *Xylomiges conspicillaris* is to be found in May and early June on old stumps, fences and gate posts, and looks just like a splinter of the wood on which it sits.

2.—During late May and early June the reed-beds should be swept after dark for the larvæ of *Leucania straminea*. I have seen the larvæ near the tops of the reeds in large numbers, and used to pick off those within reach, and sweep for the more distant ones. The larva pupates in (or on) the soil, and emerges without much trouble.

3.—At the end of May the heather should be swept for larvæ of *Agrotis agathina*. The advice of the Rev. C. D. Ash, as to rearing this species (*antea*, vol. ix., pp. 96-97) seems to have proved most valuable to those who have followed it.

4.—The larva of *Taeniocampa populeti* are sometimes very abundant in June on poplars and aspens, hiding between united leaves by day.

5.—Towards the end of May tracks made by crawling larvæ may be seen on the coast sand-hills at the edges of the patches of dwarf willow (*Salix repens*). If one of these be traced, it will be found to end abruptly at a small upheaval in the sand. Under this is the larva of *Agrotis praecox* (Almond). The larvæ are very frequently stung by ichneumons. Sea birds (gulls) look for their nocturnal tracks on the sand-hills, and scratch them up for food in the daytime. Full-fed June 13th-20th (Kane).

6.—The larvæ of *Geometra papilionaria* are to be found towards the end of May, firmly attached by the anal claspers to the twigs of birch, alder and hazel. Their resemblance to the catkins is remarkable.

7.—The imagines of *Eupithecia plumbeolata* may sometimes be obtained freely among *Melampyrum pratensis*, in woods and meadows, flying at dusk in early June.

8.—During the whole of the summer months, May-August, the larvæ of *Myelois pinguis* inhabit the living bark of ash, frequently pollard trees, never affecting any dead or decayed portions of a tree, nor penetrating into the wood. It does not eat far into the bark, however thick, and a few long black grains of frass block the entrance. This frass is characteristic, and should be looked for when searching a tree on any projecting bosses as well as on the spreading foot, for stray grains of frass detected below afford a good clue to the situation of the mine above (Buckler).

9.—The larvæ of *Crambus salinellus* should be searched for in May and June, under stones resting on *Poa* grass. Turning over the stones exposes the tubular gallery attached to the lower whitish sheaths of the grass towards the roots, or to the stone itself (Buckler).

10.—From the beginning to the middle of June the larvæ of *Plutella annulatella* are to be found on *Cochlearia anglica*.

11.—The larvæ of *Gelechia albipalpella* make conspicuous blotches in the young shoots of *Genista anglica* in the early part of June.

12.—In early June the pale green larvæ of *Hypolepia sequella* may be beaten from maple. They are exceedingly active.

13.—The larva of *Penthina corticana* feeds on birch and sallow, in May and the early part of June.

14.—The larvæ of *Anarsia genistae* should be collected in May and early June, when they are feeding on the shoots of *Genista tinctoria*. The larvæ of *A. spartiella* feed on shoots and flowers of furze at about the same time.

15.—The larvæ of *Gelechia gerronella* may be found in the early part of June feeding on furze.

N.B.—Hundreds of similar "Practical Hints" referring to a very large proportion of the British lepidoptera, have been printed in the preceding volumes.

VARIATION.

Aberration of Lophopteryx camelina.—I bred, on July 30th last, a curious dwarfed example of *Lophopteryx camelina*, without lobes on the inner margin of the forewings.—F. G. Whittle, 3, Marine Avenue, Southend.

Aberration of Noctuids.—In looking through my collection, I have noticed the following forms all taken near here: (1) *Leucania favicolor* (or very near), spotless. (2) *L. pallens* var. *arcuata*, *Xylophasia monoglypha* var. *aethiops*, and *Grammesia trigrammica* var. *obscura*.—Ibid.

Variation in width of marginal band of Cyaniris argiolus.—Some of my female *Cyaniris argiolus*, which I have taken here, are rather striking on account of the blue having a tinge of chalkiness in the tint, whilst the black on the costa and the hind-marginal black band of the forewings are of considerable width. This is in marked contrast to two which I have bred this year from pupæ kindly given me by my friend Dr. Crallan, in which the band in the forewings narrows rapidly after about the middle of the wing, in one insect to a point, and in both specimens disappearing before reaching the inner margin. My first bred specimen—a male—emerged on April 6th. The first captured—likewise a male—was on April 20th.—Joseph Anderson, Chichester. *May 2nd*, 1900.

COLEOPTERA.

PARNUS NITIDULUS AT CHIPPENHAM.—On a visit to Chippenham Fen in August last, with my friend Mr. Donisthorpe, I was fortunate enough to take a specimen of this rare beetle; it was in company with *P. auriculatus*; the red legs at once distinguish it from the other species. As far as I am aware, the only record for very many years was one made by Mr. Donisthorpe, in 1898, from the same locality, and I was present when he took his specimen.—FRANK BOUSKELL, F.E.S., F.R.H.S., Market Bosworth.

SCIENTIFIC NOTES.

BREEDING SPHINX CONVOLVULI.—It has been suggested to me by Mr. Tutt that the following details as to breeding *Sphinx convolvuli* would be interesting to British lepidopterists. From August 14th-16th, 1894, I found four larvæ of this species, from August 12th-14th, 1895, two larvæ, and on August 16th, 1897, one larva, at Dover, at the back of the prison. Two were brown in colour and were preserved, the others were greenish-brown in tint and worked out as follows:

1894. Larva taken August 14th, pupated August 20th, emerged October 7th.
Larvæ (2) taken August 15th, one pupated August 17th, emerged October 5th (the other preserved).
Larva taken August 16th, pupated August 19th, emerged October 10th.
1895. Larvæ (2) taken August 12th, one pupated August 13th, emerged September 30th (the other preserved).
Larva taken August 14th, pupated August 16th, emerged October 9th.
1897. Larva taken August 16th, pupated August 24th, pupa died.

The locality is now all dug away for the new harbour works. They were bred indoors in a living-room, fed on dwarf convolvulus, two of the larvæ were somewhat small when taken, but grew very rapidly in a week, after the habit of *S. ligustri*, when in its last stadium.—C. P. PICKETT, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *April 29th*, 1900.

THYREOSTHENIUS BIOVATUS IN NESTS OF FORMICA RUFA.—An adult female of this minute spider was kindly sent to me recently, by Mr. Horace Donisthorpe, by whom it was found in the nest of *Formica rufa* in Guestling Wood near Hastings, while searching for other dwellers in ants' nests. It has long been known to domicile with *F. rufa*, and has been recorded from France, Germany and Holland, but Mr. Donisthorpe's capture is the first record of it in Great Britain. The following synonymy and notes may be interesting:

THYREOSTHENIUS BIOVATUS, Camb. = *Erigone biovata*, Camb., "Proc. Zool. Soc. Lond.," 1875, p. 215, pl. xxix., fig. 22 (from near Rouen, France) = *Peponocranium biovatum*, Camb.-Sim., "Araneides de France," tom. v., p. 186 (1884) = *Thyreosthenius biovatus*, Camb.-Sim., *l.c.*, p. 876 = *Walckenaera biovata*, Camb. Van Hasselt, "Catalogus Aranearum in Hollandia inventarum," Supplementum ii. "Overgedrukt uit decl. vanhet Tijdschr. v. Entomologie," pp. 8, 29, 32, 1890, and supplementum iii., *l.c.* xli., 1898, p. 27.

—(REV.) O. P. CAMBRIDGE, M.A., F.R.S., Bloxworth, Dorset. *April 24th*, 1900.

COMPOSITE COCOONS AND EMERGENCE OF LACHNEIS LANESTRIS.—Referring to my notes on the habits of the larvæ of this species (*ante.*, vol. xi., pp. 28-34), I am now able to give particulars relative to recent emergences of imagines. I find that I inadvertently misstated the number of the larvæ comprising the nest, it should have been 200. I placed the cocoons on moss and kept them in an unheated well-aired

room throughout the past autumn and winter, occasionally damping them. The results, so far, I consider satisfactory, the following emergences having taken place: April 1st, 14 ♂, 9 ♀; 4th, 15 ♂, 27 ♀; 6th, 7 ♂, 4 ♀; 7th, 11 ♂, 9 ♀; 10th, 8 ♂, 15 ♀; and 11th, 3 ♂, 8 ♀. The imagines commenced to appear at 9 a.m., and continued to do so until 6 p.m., the majority emerging in the late afternoon. Of the 58 ♂ and 72 ♀ which emerged 2 ♂ and 4 ♀ only were crippled, but the hindwings of 5 per cent. of the ♂s and 20 per cent. of the ♀s were imperfectly formed. As imagines in one or two cases only emerged from the composite cocoons I opened several of the latter. The majority contained two dead larvæ, others three, and the largest as many as eleven. Owing probably to the space within the composite cocoons being too confined the larvæ had failed to complete their pupation. The formation of these cocoons I am now convinced resulted from overcrowding of the larvæ. There are still remaining about thirty of the single cocoons and half-a-dozen of the composite. Some of the former I am satisfied from examination contain living pupæ, which may produce imagines another year, but it is very doubtful whether the latter do. The imagines obtained were all normal in size and type.—A. Russell, F.E.S., Southend, near Catford, S.E.

CURRENT NOTES.

Professor Fernald, of the Massachusetts Agricultural College, sends us a prospectus which sets forth the work required for students to obtain a degree in Zoological and Entomological Science. The course is evidently an excellent one, and no doubt students of the College who obtain this degree will be selected to fill the posts of State entomologists and similar positions in the various public institutions.

At the meeting of the Entom. Society of London on April 4th, Mr. McLachlan exhibited an extraordinary aberration of *Enallagma cyathigerum*, Charp., taken by Mr. Morton in Glen Lochay, Scotland. The remarkable feature consisted in the predominance of black over blue in the coloration of the abdomen.

When available, the editor would be glad to have pupæ, eggs and newly-hatched larvæ (in spirit) of our British Hepialids—*Hepialus humuli*, *H. velleda*, *H. sylvinus*, *H. hectus*, *H. lupulinus*; also newly-hatched larvæ of *Zeuzera pyrina* and eggs of *Cossus ligniperda*. It is hoped that all lepidopterists who obtain eggs of these species will spare at least one or two for description. We would also suggest that systematic details as to dates of emergence, exact duration of egg, larval and pupal stages, and other interesting information relating to the common Sphingids, would be very useful.

We are pleased to observe that applied entomology has been recognised, in so far that Miss Ormerod has been made Hon. LL.D. of Edinburgh University—the first woman thus honoured.

Professor J. W. Carr and the Rev. A. Thornley are collecting insects of all orders, with a view to the publication of an "Insect Fauna of Nottinghamshire." They would be very grateful for records for the county. We have received the last year's report of the Nottingham Naturalists' Society, in which there are several interesting entomological articles, the chief of which is "Nottinghamshire Diptera," by the Rev. A. Thornley.

Collective inquiry as to Progressive Melanism in Moths.—Memorandum from the Evolution Committee of the Royal Society.

The committee appointed by the council of the Royal Society to promote investigation of facts relating to "variation," "heredity," "selection," and other phenomena connected with evolution are desirous of instituting a collective investigation into the progressive melanism of certain moths, particularly *Geometridae*. It is well known that in certain districts, especially within the British area, dark forms of several species of moths have recently appeared and become increasingly abundant. There is reason to believe that these dark forms are in some cases extending into other districts and even to the European continent. It is to be regretted that no systematic or statistical records of these phenomena have been kept, and it appears to the committee that if such a record be now instituted and continued for a period of years it cannot fail to have considerable scientific importance. The matter is one that may conveniently be made the subject of collective investigation, and the committee will be glad to hear from any entomologist who may be willing to contribute now, or hereafter, particulars as to the condition of these species in the district or districts with which he is personally familiar. The returns should relate as far as possible to specimens *found in a wild state*, whether as imagines, or pupæ, larvæ, or eggs. Information respecting specimens bred from wild parents must be kept distinct. It is thought desirable that the enquiry should for the present be confined to the following species:

Acidalia aversata, *Amphidasys betularia*, *Boarmia repandata*, *Camptogramma bilineata*, *Gnophos obscurata*, *Hemerophila abruptaria*, *Hybernia progemmaria*, *Phigalia pilosaria*, *Acronycta psi*, *Agrotis corticea*, *Aplecta nebulosa*, *Polia chi*, *Venusia cambrica*, *Xylophasia polyodon*.

The schedule in which it is suggested that the returns should be made is termed Schedule A. It is desired that the return for each species be made on a separate schedule, and the secretary will be glad to furnish a supply of these schedules to any one who may be willing to assist. Since confirmatory evidence is of especial value, the committee are desirous of receiving returns made independently by different persons for the same district. It is of course hoped that returns may be obtained for districts in which the dark forms are still unknown. The secretary will be glad to examine and prepare descriptions of any illustrative specimens lent to him for that purpose, and in suitable cases arrangements will be made for photographing such specimens.

Historical Evidence.—As the changes in question have largely taken place within living memory, it is hoped that those who have personal knowledge of the facts may be induced to put them on record in such detail as is still possible. Much information of a historical character is of course already printed in the scientific journals, but a more detailed account of the facts would be of great value. With this object a special schedule (B) marked "Historical" will be issued to those who will fill it up.

On publication full acknowledgment will be made of all help received. All communications should be addressed to the Secretary of the Evolution Committee, W. Bateson, Esq., F.R.S., Merton House, Grantchester, Cambridge.—*May*, 1900.

Errata.—p. 109, line 1, for "first" read "post"; line 2, for "free" read "pre"(-spiracular).

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West, Newman lith.

Regeneration of Legs in Liparis dispar.

Entom., Record. etc., 1900.

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XII. No. 6. June 1st, 1900.

The Relationship between the Larval and Imaginal Legs of Lepidoptera (*with Plate*).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The Orthoptera, which we may assume, for our present purpose, to have been the primitive insects, leave the egg with their legs, as far as number of articulations is concerned, except perchance as to tarsal joints, precisely of the same structure as they present in the mature insect. In Lepidoptera this is not so, the larvæ have legs consisting of a basal piece, of three chitinous joints, and a terminal claw, with palpal appendages; whilst the imago has eight articulated pieces in the leg besides the claws and appendages. It even happens in some species that the larvæ are without legs. This is a common condition in Coleoptera, Diptera, and Hymenoptera.

On examining the leg-structure of a typical imago of almost any order, we find the tarsus consisting of various articulated segments up to five, of the two long segments, the femur and tibia, and of two basal segments, the coxa and trochanter. If we take a *Micropteryx* or *Eriocrania* we find precisely these structures, but if we select any of the higher lepidoptera, say *Porthetria dispar*, we find this structure present only in the prothoracic legs. In the others the first or coxal piece is soldered to the thorax, and though we may think we see its outlines, it is doubtful whether that is so, so that the statement with which I began, that there are eight articulated segments to the limb, is correct as to these, but the prothoracic leg has nine.

It is to be remarked here that the larvæ of Trichoptera have both coxa and trochanter well-developed, contrasting strongly with their absence in lepidopterous larvæ, and making one of the strongest points in their claim to be a separate order from Lepidoptera. Nevertheless the remaining three joints in the larval trichopterous leg, are remarkably like the three joints in the lepidopterous larva, and since in the trichopterous larva these are unquestionably the femur and tibia and the tarsus reduced to one joint, the close alliance of the two groups justifies us in making the three joints of the larval leg in Lepidoptera the femur, tibia, and tarsus.

Assuming the descent of the Lepidoptera from some Neuropteron, and ultimately from some Orthopteron with fully developed larval appendages, we are given two theories of how the lepidopterous larva became so worm-like and with such degenerate appendages. One, which I fancy is now obsolete, is that the lepidopterous larva repre-

sents vermiform stages that the Orthopteron passed within the egg. The other is that it is descended from, and represents, the active pre-imaginal states of the Orthopteron. That there is no retrogression in the sense that the other theory assumed, but merely modifications of various parts to meet various needs, modifications amounting in some cases to temporary suppression of parts and their reduction to imaginal discs, *i.e.*, collections of embryonic cells, undergoing no development until a very late stage in the life-history—this being, nevertheless, no retrogression, but really an advance. That this latter theory is correct seems proved for us by the crucial examples afforded us in the parasitic beetles, *Meloë*, *Mylabris*, *Metoecus*, and others, as well as other forms such as *Stylops*, which is perhaps truly a beetle. These hatch with good articulated legs, which they afterwards entirely lose and regain as imagines. In these, therefore, the vermiform stage is posterior to the articulate ones, and cannot, therefore, be descended from a stage anterior to that possessing limbs.

When larval limbs are entirely absent the imaginal limbs exist in the larva as imaginal discs. How do they exist in the typical lepidopterous larva with 3-jointed corneous legs?

It is necessary to clear the ground a little, and ask ourselves what we definitely mean by this question, and what alternative answers may be or have been given. On the one hand we observe that in an Orthopteron at each moult the new leg is formed within the old one, and is withdrawn from it at the moult, or, more accurately, the new leg is the old one enlarged and grown, and freed from the external chitinous sheath, which had grown too small for it. Is the lepidopterous leg in this case? Is the imaginal leg really the larval leg grown and developed?

On the other hand, in the apod larva the imaginal leg is an imaginal disc. Is this also the case in the lepidopterous larva, the larval leg being got rid of as a larval appendage that has completed its life cycle and its usefulness, the new or imaginal leg entirely developing from an imaginal disc within the body of the caterpillar?

I believe the former is the true answer, the larval leg is the imaginal leg also; but this answer must be modified to this extent, that the imaginal leg is so far different from the larval one, that it is to a great extent a new development, arising, therefore, to that extent, from imaginal discs, *i.e.*, reserved embryonal cells, but with this important difference from the second answer I have suggested, that they are situated each within its own segment of the larval leg, or even more definitely, each in association with its own portion of each segment. The imaginal tarsus arises from the actual larval structures of the third joint of the larval leg and from embryonal cells situated amongst them, the imaginal tibia in the same way from the larval tibia, and so on, the trochanter and coxa being almost entirely in an embryonal state at the base of the leg. This answer, which I support, is that that has been long held by the few entomologists who have paid any attention to the matter, and was believed to be supported by certain experiments of Reaumur's* and Newport†, as to the effect on the imaginal structures of removing the larval legs.

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* Reaumur, *Mémoires des Insectes*, i., p. 365 (1734).

† Newport, *Phil. Trans.*, 1844.

So far back as 1894, however, J. Gonin published a most valuable paper on the metamorphosis of lepidoptera in the *Bulletin de la Société Vaudoise des Sciences Naturelles*, in which, amongst a most excellent series of observations on the development of the appendages of *Pieris brassicae*, for nearly all of which I have nothing but praise and agreement, he adopts with regard to the legs the second answer, *viz.*, that the imaginal legs entirely originate from imaginal discs within the body of the larva. Or he may, indeed, be understood to say that the imaginal tarsus arises from the larval leg, and some of his expressions imply that he regards the three joints of the larval leg, not as being respectively femur, tibia, and tarsus, but as being actually three joints of a tarsus, the representation of tibia and upwards being within the larval body.

The question is thus expressed by Gonin (*Bull. Soc. Vaud.*, vol. xxx., 94), that Reaumur has been misrepresented, and that his actual words are, that he cut off "more than the half of three of the true legs," and found that the chrysalid had "the three legs of the side *shorter* than the corresponding limbs of the other side," and that a larva experimented on at a younger stage showed a fresh three limbs in the pupa, but "atrophied," that is to say not entirely absent, and he criticises Künckel for saying that it is clear that "Reaumur, having completely cut off one of the true legs in some caterpillars, proved that the butterfly that emerged was without the corresponding appendage," and says that Newport denied this disappearance of the legs, and regarded the limb as partially regenerated. He then goes on to describe the state of matters at the date of the change to pupa, when the greater part of the leg has so far assumed its imaginal character, and increased in size, as to have left the larval leg, and to be pressed together at its base within the larval skin, leaving only a portion in the larval leg roughly corresponding to the tarsus, and, though he seems to have a good grip of the processes by which the imaginal leg arises, he appears in a fashion curiously illogical, considering his actual knowledge, to believe that the condition at this date, *i.e.*, the moment preceding the moult to pupa, represents the true relations of the larval to the pupal (or imaginal) leg, *viz.*, that the imaginal leg arises from larval structures situated where he finds it at this late period, when it has really by growth left its confined quarters in the larval leg, and that the larval leg corresponds to the extremity (say tarsus) only of the imaginal limb, and that the rest exists in the larva merely as an imaginal disc not within the larval leg, but in the body of the larva at its base.

Newport's experiments, fully recorded in the *Philosophical Transactions* for 1844, relate to *Aglais urticae*, and, properly interpreted, seem to render Gonin's position untenable, whilst the results correspond entirely with those of the experiments I made last year; he brings out a point with which I did not meet frequently enough to note it definitely, and that is, that removal of a portion only of the leg results in the tarsus being reproduced in an incomplete state, that is with less than five joints. His observations on the reproduction of spines and spurs do not quite accord with mine, but this also seems to have occurred in the case of partial removal. Newport's experiments were made with a view to learn whether regeneration of amputated parts occurred in lepidoptera; mine were chiefly with a view to test Gonin's

position, that no part of the imaginal leg existed, or was represented, in the larval leg, except, perhaps, the tarsus.

My position is to assert the older idea, that the three parts or joints of the larval leg are femur, tibia, and tarsus, and that these parts of the imaginal leg originate in those larval sections. And I expected to find that a leg regenerated, which ought by Gonin's hypothesis to be, as regards the femur and tibia, the normal leg of the imago, would not be so. Newport's experiments, I think, suffice to show that my view of Gonin's position is correct, but one always likes to verify these matters one's self. The few experiments I made last year on this subject, were really made rather with a view to finding out how to attack it than with any hope of a definite result. They do, however, present enough material to yield some definite results, confirmatory of the hypotheses I have adopted, and, I think, negativing that upheld by Gonin.

The question is complicated by the many interesting facts of regeneration, which would well repay further more accurate experiments, and it is rather in their bearings on that side of the subject than on that before us, that my experiments must appear so meagre and inconclusive.

My experiments consisted in removing the whole or portions of the third left leg of certain larvæ. Those I used were *Porthetria dispar* and *Saturnia pavonia* (*carpini*). The latter are still in pupa. The results I lay before you are only those of the former species. I selected these two species merely because I had an abundance of eggs of each. I removed only one leg (though sometimes I fear injuring others, through the struggling of the larva), as interfering less with the health and progress of the larvæ. One leg also enabled a comparison to be made with the leg of the opposite side. I selected the third leg because it is hidden in the pupa beneath the wing, and so would not leave an abnormal vacancy on the pupal surface, which is often fatal in pupal existence.

I began by chloroforming my larva, with a view to proper humanity, but found that chloroform inflicted much greater inconvenience on the larva than to hold it firmly in the fingers and snip off the limb. The inconvenience this caused both at the time and afterwards was much less than I anticipated. I imagine that no actual pain is felt in our meaning of that word. Newport gives some details of the effects of the operation on the health of the larva and the healing of the wounds. The preparations I show you are the two third legs of the imagines, and the same portions of the larval skin found with the pupa. The larval skin of *Porthetria dispar* does not shrivel up very much at the pupal moult, so that by soaking it in ammonia for some time I have been able to unravel it to some degree, and in a few instances with very fair success.

The specimens will, to a great extent, explain themselves. That represented in pl. vi., fig. 1 may be taken first. On the right side (left as mounted) of the insect, the larval and imaginal legs are normal. On the left the larval leg is a mere stump, but examination shows that it possesses all the parts of a complete larval leg, three joints and a claw. In this case the leg was removed in an earlier skin, removed to its base, and we here have in the last larval skin a regenerated leg, though of very small size. The parts are all there,

and have only to grow at each successive moult to replace the limb of full size. Had the amputation taken place at the first instar this would probably have occurred. When we come to the imago we find that the limb is complete, and has grown by aid of the two intervening moults to a size, though obviously not very much, still less than the other. We may reach several conclusions from this specimen. (1) There is a regenerative centre at the base of the leg, that can renew the larval as well as the imaginal leg. (2) It cannot be the source of each new larval leg at each moult, or it would have given rise to a full-sized leg, instead of a mere sketch of one. (3) It is nevertheless sufficiently large for a full-sized imaginal leg to have resulted, if the imaginal leg arose entirely from the basal germinal plasm. Observe that not only the tarsus is smaller than that on the right side, but also both the femur and tibia.

(*To be concluded.*

Psychides in 1900.

By L. B. PROUT, F.E.S.

I cannot hope that a few scrappy notes of a beginner in the study of this interesting group will be of any value to those entomologists who have had many years' experience of them ; but as it is quite probable that there are some who, like myself, have been drawn to them by the recent work which has been done by Dr. Chapman and Mr. Tutt, I think I may be interesting a few at least by putting on record my observations so far as they have gone. They certainly illustrate once again how easily one overlooks what one does not look for, for I never saw a *Solenobia* or *Luffia in situ* until this season ; and it seems very probable that if our collectors will only set themselves to search for them, we shall soon add enormously to our knowledge of their distribution; at any rate, I have had no cause to complain of the results of my first endeavours in this direction.

A brief visit to Sandown, from April 9th-21st, did not witness much serious collecting, but it afforded a good many opportunities for trunk-searching. So far as I know, nothing has yet been recorded as to the Psychids of the district—A. G. More's list, in Venables' *Guide*, does not include a single species; I will, therefore, give a list of all localities where I found them, though unfortunately the more difficult species are not yet named.

Taleporia tubulosa, Retz. (*pseudobombycella*, Hb.). A few cases in Centurion's Copse, near Brading, and one in Bordwood. I also took it a few years ago in Alverstone Lynch.

Luffia, ? sp. Very common in Centurion's Copse, also in Youngwood Copse, Alverstone; swarmed on some oak trees on a hill-side near Alverstone, I took 60 off one tree, and left a large number behind, and I noticed that several of the other trees were just as densely populated. I take the examples from all these localities to be the same species, but of course I may be mistaken. I also took two apparently belonging to the same species in Rowdown Copse, Brading Down, but it must have been singularly scarce there. I worked 100 out of the 150 or so well-grown trees which the copse contains, as I was hoping to find *Diplodoma herminata*, of which I took a single case there in 1899 ; my quest was, however, quite fruitless, so far as that species was concerned. The

only copses which I worked without finding the *Luffia*, were Bordwood and Littlecastle Wood, in the former of which the favoured kind of lichen seems comparatively scarce.

Solenobia, ? sp. A few in Centurion's Copse, amongst the Luffias; three, and a few empty cases in Littlecastle Wood ("America Wood"), near Shanklin.

Fumea casta, Pall. (*intermediella*, Brd.). When Mr. H. H. May was with me at Sandown last autumn, we were one morning seeking shelter from a passing shower, on a seat on the beach near Littlestairs Point, when he called my attention to two empty cases of this species spun up on the arbour of sallow, &c., which overhung us. I therefore worked the spot this spring, and found a dozen or so half-grown specimens of *F. casta*, all quite low down on the sallow trunks or on withered grass stems close by; as is well known, this species does not generally go up to any height until full-fed. Judging from last years' cases, this is one of the large forms of the species, and of course it is quite possible it may turn out to be something interesting. A few typical cases of *F. casta* were also found inland, in Rowdown Copse and Littlecastle Wood.

Since my return to London I have given a little attention to tree-trunks in Epping Forest, as there is some mystery about the Proutias occurring there—one or two of my specimens having been determined by Dr. Chapman as probable *betulina*, though apparently not absolutely identical with Mr. Whittle's, while others are supposed to be "*eppingella*, n. sp."—and more material is highly desirable. Thus far, I have only found four, three on one hawthorn trunk, and one on another; they are not yet full-grown, and I find they eat leaves of hawthorn and plum. The only place where I have taken them, either this year or previously, is near the Connaught Water, just to the eastward of the "Red Path."

In the same place, I found a very few larvæ of a *Solenobia*, which seems to me to agree entirely with my Sandown species; also a few empty cases of *Fumea casta*.

I have already alluded to my unsuccessful hunt for *Diplodoma herminata*, Geoff. (*marginepunctella*, Stph.). I have to add that I was highly pleased last Saturday (May 5th), to pick up a larva low down on a willow trunk on the Sale, at Hale End. I have been a good deal interested in watching its performances. I first put it in an empty chip box, but an hour or two later I introduced with it a specimen of the *Solenobia* just mentioned; opening the box again a few minutes afterwards, to put in another, I found the *D. herminata* watching at the mouth of the first *Solenobia* case, like a cat at a mouse hole. Very soon the occupant made its appearance, and *herminata* made a savage pounce upon it; but it was wary enough to withdraw itself rapidly into its domicile, and I then removed it out of the way of harm. On my return home, I offered my *Diplodoma* the first animal food which came to hand, namely a dead *Coccinella* and *Endrosis* which I found in a spider's web; the former was apparently too hard and dry, but the latter seems to have pleased it well, for by the next morning its case was well adorned with pieces of the wing, quite in the approved style.

I may add that Clark and Machin in a MS. list of the Micro-lepidoptera of the London district which now lies in my hands (as editor of the City of London Entomological Society's Local List), record both *Diplodoma herminata* and *Narycia monilifera* (*Nysmatodoma*

melanella) for Epping Forest, but no species of *Solenobia* nor Fumeid; probably *F. casta* was omitted because of the difficulty of assigning a correct name in those days of confusion amongst "*intermediella*," "*roboricolella*," and the rest of them; I have a distinct recollection also of seeing a *Prontia* in Mr. Machin's collection a short time before his death, and of his stating to me his conviction that it was a separate species, but I cannot say whether the species in question was or was not from Epping Forest.

The Guests of Ants and Termites (*with Plate*).

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

(*Continued from p.* 119.)

The localities where this insect had so far been discovered were also given, namely, Nicaragua, Costa Rica, Panama, Columbia, Cayenne and Brazil, to Rio de Janeiro. The biological note was as follows: "Though this wonderful insect is widely distributed, it seems to be a very rare species, as so few examples have been found. Its life-history is unknown, but the late Mr. Belt told me that he had generally found it on ant-hills." I then looked up Belt's *Naturalist in Nicaragua*, and on p. 84 found the statement, that a large species of *Staphylinus* lived in the *Atta* nests of Nicaragua. There was hardly a doubt that the *Atta* guest spoken of by Belt was the same as the one before me. The logical chain of evidence was concluded *a posteriori*, and my supposition was confirmed. According to the accepted laws of nomenclature laid down by the German Zoological Society, this beetle should be named *Smilax pilosus*, F., since *Smilax* was the generic name given to it by Laporte. Nordmann changed it later to *Cordylaspis*, as there is a plant called *Smilax*. It is quite true that the same name must not be used twice in Zoology, but a botanical name has nothing to do with a zoological one, therefore, the beetle must be again called *Smilax*. This beetle was described by Fabricius in his *Mantissa Insectorum*, 1787, as *Staphylinus pilosus*, but a whole century has elapsed before it has been discovered to be a true ant guest. Belt gives as a reason for its appearance on these ant-hills that its larva feeds on the decaying leaves of which the sloping *Atta* nests are constructed, but this is very unlikely, as the larvæ of the *Staphylinidae* are carnivorous. Bates also found the insect in Brazil, but never mentioned its connection with ants. The fact that *Smilax pilosus* has so far only been found singly can be explained by its being a true *Atta* guest. *Atta sexdens*, L., *cephalotes*, L., *ferrens*, Lay, and *columbica*, Guer., only can be its hosts on account of its great size, and these make gigantic nests which stretch underground for many miles, their population consisting of hundreds of thousands and even millions of big-headed worker-ants, which are so well armed that their bite draws blood. It is, therefore, very difficult to search their nests, and for that reason one can understand why so little is known of their guests. Whoever cares to search for *Smilax pilosus* among these species of *Atta* will undoubtedly find it in large numbers.

The biological divisions of the genuine ant and termite guests can be divided into four classes according to the different kinds of intercourse which exist between them and their hosts.

(1) The genuine guests, who receive true hospitality from their hosts, being either fed or licked, or both (Symphilen).
(2) The indifferently tolerated lodgers, which stand in different degrees of intercourse, and are tolerated for different reasons (Synoeketen).
(3) The hostile persecuted lodgers, who force themselves on their hosts, and generally live on them or their offspring as beasts of prey (Synechthren).
(4) Parasites, both inner and outer, who sponge either in or on the ants, their offspring, or their guests.

The number of true guests in the Myrmecophilous Coleoptera is very large, although we possess an exact knowledge of the habits of only a few species. We know a number are licked by the ants on account of a flowing etherealised oil which they obtain from certain organs of exudation. These organs are morphologically recognisable, and we can, therefore, reckon the number of beetles possessing them at 250 to 300. To this *élite* among the ant guests we can place the *Lomechusa* group in the *Staphylinidae*, also the *Clavigeridae*, *Gnostidae*, *Ectrephidae*, most of the *Paussidae* and *Thorictidae*, the immense group in the *Histeridae* (*Hetaeriini*), and lastly, several *Nitidulidae* (*Amphotis*), *Silphidae* (*Lomechon*), *Scarabacidae* (*Cremastochilus*), and *Brenthidae* (*Amorphocephalus*). This, however, does not exhaust the list. I have just received from Camerun a new genus of *Tenebrionidae*, which has received the name *Pogonoxenus*, on account of its moustache-like yellow tuft of hairs, and which is certainly a true guest. First of all among the true termite guests must be mentioned the fat (physogastren) genera *Corotoca*, *Spirachtha*, *Termitogaster*, *Termitobia*, *Xenogaster*, *Termitochara*, *Termitomorpha*, and another undescribed genus *Termitophya*, just received from Father C. Heyer, S.J., in Rio grande do Sul, in the *Staphylinidae*. In the *Scarabacidae* the genera *Chaetopisthes* and *Termitodius* belong to the true termite guests, and the larvæ of *Glyptus* and *Orthogonius* in the *Carabidae*. The exudations obtained from the true guests among the Coleoptera, by the ants licking them, are more luxuries than real means of existence, as there are generally only a small number of such true guests in one nest. They obtain a more substantial means of subsistence from the honey-gathering plant, and shield lice, as well as the larvæ of the tropical *Membracidae* and *Fulgoridae*. These can only be reckoned among the true guests in so far as they are bound to the society of the ants, and are not sought by them at odd moments. The plant louse, *Paracletus cimiciformis*, Heyd., for instance lives regularly in the nest of *Tetramorium caespitum*, and is a so called "honey-cow." The myrmecophilous caterpillars of the *Lycaenidae* are also connected with ants (symbiosis), they are sought by the ants on their food-plant, and licked and protected by them. The glands in the 11th segment which store the honey, must be considered as specially devoted to this purpose. These caterpillars often change to chrysalides in the nests or even live in them as caterpillars, as has been noticed in many species by Dr. Brauns at the Cape.

The indifferently tolerated lodgers belong to many different classes of insects, such as spiders, mites, wood-lice, &c. Their number is in about the proportion of 10-1 to the true guests. They are generally tolerated for the reason that their hosts barely notice them, either because of their small size, as in *Ptilium* and many species of *Staphylinidae*, or because of their slow movements and wooden-like appearance, as in the genus *Monotoma*, or because their host is unsuccessful in his

attacks, as is the case with the oval *Histeridae*, or on account of the quickness of their movements as with *Oxypoda* and some other of the *Staphylinidae*, and the extraordinarily quick Lepismids.

The advantages which the indifferently tolerated guests obtain by living with the ants are of very different kinds. Besides a dwelling place and the protection from enemies which they receive by living in the houses of their hosts, they also find a suitable means of subsistence. In many of them, as for instance the larva of *Cetonia floricola* and beetles of the genera *Monotoma*, *Corticaria*, *Cartodere*, *Ptilium*, &c., their food consists of the vegetable substances and decayed remnants of the nest. The food of the *Colnocera*, that dwell among the corn collecting ants consists of the provisions stored in their hosts' granaries. For many other guests, especially in the *Staphylinidae* and *Histeridae*, their food consists of the dead bodies of the ants, and of their pupæ, and also the dead bodies of other insects which their hosts drag in as prey into their nests. They live as scavengers as well as lodgers, parasites in the widest sense of the word, at the expense of the ants, and do not even spare the latter's offspring when an opportunity presents itself. The genus *Dinarda* is a good example of this mode of living. In imitation of the jackal they tear to pieces the bodies of the insects brought in as prey by the ants, also the latter's dead, and their empty pupa-cases. I once saw a *Dinarda dentata* steal an egg from a big mass of them in a nest of *Formica sanguinea*, and creep with it into a corner. I have often seen *Dinarda hagensi* take part of the food of two ants feeding each other, it does so by raising itself between the two and licking the drops of food as they fall. Ch. Janet often noticed this method of feeding with *Lepismina polypoda*, and called it "Myrmecocleptie." To the *menu* of *Dinarda dentata* we may add the soft larvæ and pupæ of the *Acarina* that live in the nest of its host. It prevents, as I have often noticed in my observation-nests of *Formica sanguinea*, the rapid increase of *Tyroglyphus wasmanni*, an increase which is so fatal to the ants ; it also destroys the young of *Leolaps*. On August 26th, 1896, I watched a very curious scene (plate, fig. 2). A *Lomechusa*, in the big *F. sanguinea* nest which had stood for many years in my study, came out of a part of the nest used by the ants as a waste bin for the refuse from their nest, and which swarmed with mites. The upper part of the hind body of the *Lomechusa* was covered with these tiny creatures, which appeared like innumerable little white spots moving rapidly about, and which, examined under the lens, turned out to be the larvæ and pupæ of *Leolaps myrmecophilus*. The *Lomechusa* seemed very uneasy, it ran nervously up and down, its agitation contrasting strangely with its usually solemn demeanour. It then met a *Dinarda dentata*, which reared up on to its back with its fore feet. It now stood quite still, and in a few seconds the greater part of the mites were devoured or chased away by the *Dinarda*.

To the hostile persecuted lodgers belong the brachyelytrous genera *Myrmedonia*, *Myrmoecia*, *Lamprinus*, *Quedius brevis* and *Xantholinus atratus*. Their large size prevents them from being tolerated, as they instantly attract the attention of their hosts. They live as beasts of prey on the ants and their young, but as we have already shown, thieves and robbers are to be found amongst the tolerated guests, and even in the true guests, which, in spite of all the care and kindness they receive, are no better than thieves. It is these in particular who do the greatest

harm to their hosts, by devouring the brood of the latter, a greater harm in fact than is brought about by any of the persecuted lodgers. I can even prove that the voracity of *Lomechusa* and *Atemeles* causes a decrease among the worker ants, which is called Pseudogyna, and brings about the deterioration of the ants' colony.

The fourth class before mentioned is made up of parasites in the true sense of the word. To these belong, for example, many small Hymenoptera (*Elasmosoma*, *Pachylomma*, *Eucharis*, &c.), and *Pelodera janeti*. Whereas these belong to the Entoparasites, others are Ectoparasites, which fasten themselves on the bodies of the ants or their offspring. A little time ago Dr. Brauns discovered a new species of the family *Tachyporina* in the nest of *Dorylus helvolus* in Cape Colony, and which I described as *Doryloxenus cornutus*. This little insect has got shortened tarsi and tibiæ covered with bristles, with which it probably fastens itself on to the larvæ of the ant; the anterior tarsi instead of being provided with claws, possess an adhesive appendage. Possibly the little Brazilian *Eciton* guest *Ecitochara fuscicornis*, which W. Müller found on the egg masses of *Eciton foreli*, should be placed among the true parasites. A dipterous larva which Professor Emery sent me from Camerun, and which he found fastened between the head and thorax of a big black *Camponotus*, can be regarded as half Ecto- and half Entoparasitic. A third of the sponger was inside the ant and the rest of its body outside. Ectoparasites can also be found in the myrmecophilus *Acarina*, especially in the genera *Tyroglyphus*, *Discopoma* and *Antennophorus*. Most of the myrmecophilous mites belong to the genus *Leolaps* and are not parasites in the true sense of the word, but feed on the dead ants and other refuse in the nest. *Leolaps oophilous*, Wasm., however, sits on the egg-masses of the ants, it does not feed on them, but is fed by the ants licking the eggs (Syntrophie). *Tyroglyphus wasmanni*, Mon., which is often to be found in the nests of *Formica sanguinea*, lives as larva and pupa as well as in the perfect state, on the dead bodies of the ants and other animal substances, but when changing they are to be found on the ants' bodies on the masters as well as the slaves. Very often this swarming of mites takes quite gigantic proportions, each ant is covered by thousands of them, until the whole nest appears to be covered with a grey crust, and finally the entire colony is destroyed by this living disease. Less dangerous is *Discopoma comata*, Berl., which according to Ch. Janet fastens itself on to the ants when fully developed. Another myrmecophilous mite *Antennophorus uhlmanni*, occupies a most extraordinary position. Janet observed it in France in the nest of *Lasius mixtus*, and I have studied it in Hollandish Limburg with *Lasius niger* and *flavus*. It sits generally on the ant, in most cases on the underside of the head. It makes use of this favourable position to tickle the sides of the ant's head with its front feet, which are like antennæ—hence its name "antennæ bearer" (*Antennophorus*)—till the ant lets fall a drop of food which the parasite licks up. The ants tolerate the impudent rascal simply because they are unable to get rid of it. I have often seen them make desperate attempts to knock it off. The feeding of this guest is analagous with that of the bee louse, *Braula coeca*, with bees. The connection of *Antennophorus* with the ants is only a caricature of the genuine intercourse which exists between *Lomechusa*, *Atemeles* and *Claviger*, and their hosts.

(*To be concluded.*)

Notes on Malacosoma castrensis.

By W. H. HARWOOD.

Malacosoma castrensis seems to occur on all the extensive salt-marshes on the north Essex coast, between the rivers Colne and Stour. It is also—or was formerly—common on Mersea island. I know nothing personally of its distribution further south, but should think it would have a wide range in that direction. On this, other lepidopterists are likely to be better authorities than I am. Beyond the Stour it has been taken in recent years on the Suffolk side at Felixstowe, and many years ago the late Mr. N. F. Hele bred a few specimens from larvæ obtained near Aldborough. These were probably the offspring of some straggling female, which had in some way got far beyond its normal limits, but it may occur naturally further north, as in all probability neither the Suffolk nor Norfolk coasts have ever been properly searched for it by anyone acquainted with its habits. Meyrick, I see, gives York as a locality, and it would be interesting to have particulars on this point, as one would not expect to find it so far from the Thames, to the banks of which it was formerly thought to be exclusively confined. The larvæ are polyphagous, and it is rather difficult to say what saline plants they will *not* eat. Among others, I may mention that they are partial to *Artemisia maritima*, *Armeria maritima*, *Statice limonium*, *Plantago maritima*, *Silene maritima*, *Inula crithmoides* and *Atriplex portulacoides*, but, perhaps, *Artemisia*, *Statice* and *Plantago* are the favourites.

It is a very uncertain species, for though it seems to occur regularly it is sometimes very far from common, and at other times very abundant. The full-fed larvæ generally conceal themselves very effectually during the heat of the day, and come out to feed in the evening, when numbers may be found crawling or feeding where they might have been searched for in vain a few hours previously, but sometimes they may be found in the earlier part of the day, and, of course, the young broods may be found at rest on their webs at all times.

They are especially common some seasons along the base of the sea-wall, and this is to be easily accounted for, as the eggs are "lacquered" round the stems of grass and other plants, and when these become sere and brittle they are frequently broken off and borne by the incoming tides towards the sea-wall, where, sometimes, they can be easily detected by a quick eye, I frequently find them in this way, but generally leave them, unless the situation seems to be very unfavourable. Some years ago a number of gentlemen, actuated by the best intentions, published a very remarkable list of British lepidoptera, that stood in need of protection from the rapacity of collectors, in which they included a number of species that are perfectly safe, and out of which they left others that had far stronger claim to be included. Among the former was *M. castrensis*. The most rapacious collector can, in a favourable season, obtain quite as many larvæ as he can desire, and yet produce no appreciable effect, considering the very small area over which he can search for them, and the great number to be found within a very limited space; but it is a great mistake to take too many, for they require an immense deal of room to roam about in, and if many are confined within narrow limits, instead of the large

series of fine bred specimens anticipated only a few poorly coloured dwarfs and cripples will probably appear. In the matter of food they are also very particular, for though it is true that they will eat several substitute plants rather than starve, they only appear to thrive upon their natural food, of which they require an abundant and perfectly fresh supply every two or three days. I dig up the plants out of the mud and replant them in pots, and, in this way, if well watered, they keep fresh for several days.

On the continent the species is said to be be found in inland localities, and I have been asked to suggest a reason for its being exclusively a coast insect in this country. I do not profess to know the precise reason, but probably our specimens have sufficient British common sense to learn that if they went further they might fare worse, but before speaking authoritatively on such a point as this, one wants to visit the inland localities, and note the conditions that prevail there. The nature of the soil, the chemical constituents of the food-plants and other circumstances have to be considered, and of these I know nothing, and leave the explanation to those who know.

It is, however, possible that the British colonies are of continental origin, and may have resulted from eggs brought to our shores by the tides in comparatively recent times; and in this case the earliest settlers would have been reared on sea-side plants, and their successors, finding favourable conditions on the coast, would have no occasion to go inland in search of them.

When perfect insects, as in the case of *Colias edusa*, *C. hyale*, *Pyrameis cardui* and others, migrate to Britain, the chances are that, after resting awhile on the coast, they mostly disperse inland, and lay their eggs in all directions, where favourable conditions exist, but when the eggs themselves are introduced, the first generation of migrants would necessarily be reared on the coast, and in this way a littoral habit might be established, and continue indefinitely. It is likely enough that the eggs would endure immersion in sea water for a considerable time without injury, for they must be regularly covered by the high tides while still in their natural position, and apparently this must also be the case with the larvæ to a less extent. All the larvæ that I have seen have been between the sea-wall and the sea, and though during exceptionally high tides, the batches of ova must be carried much further inland, I cannot say how the young larvæ fare when they find themselves under such conditions. I have never found ichneumoned larvæ, but empty cocoons are far too common, their contents having evidently been extracted by sea birds. These cocoons must be cleverly hidden in the low herbage, as a rule, as it seems useless to look for them *in situ*. The eggs are sometimes much ichneumoned and I send a batch of empty shells, surrounded by a number of their former tenants. I do not know the name of the parasite, but perhaps some of your readers will be able to help me to discover it.

Phorodesma smaragdaria, Fabricius.

By Rev. C. R. N. BURROWS.

(*Continued from p.* 115.)

I have already remarked that last year I raised a partial second brood. I have not been able to find any record of any such experience

by other collectors. I have frequently reared the insect from the egg in captivity, and it has always previously proved difficult to pair, the females have laid few eggs, but the resulting larvæ have invariably fed up to a certain stage, and then hybernated in due course. Last year, being slack or indolent, I let my stock come out in a glass-topped tie-box, until there were some 30 battered specimens. I then began to be ashamed of myself, and examination revealed a large number of eggs. I put the box out of doors against a plant of *A. absinthium*, watched the young larvæ feed, and remarked the rate at which they grew. On August 18th, I counted over my stock, and then discovered several cocoons and empty pupa shells. Closer inspection resulted in several fatal accidents, and one live pupa—which in due course produced the imago on August 22nd. That a great many larvæ passed the usual hybernating stage I feel certain, and I am wondering how many of the 200 which I counted in the autumn will turn up this year. I have just looked at the bags in which they have spent the winter, but so far have discovered very few moving.

Just a hint as to collecting will, I suppose, be expected of me. The only imago I ever took wild I found sitting low down on the hedge, just outside Benfleet station (perhaps it had been attracted by the lamps). This was on June 4th, 1896. The larva seems to have been taken almost wherever the food-plant grows, from Tilbury to St. Osyth, except at Mucking. I have never found beating into an umbrella much good, the rubbish hides the game. The eye is the best instrument. At the slightest touch the larva drops into the very lowest hole near. Be careful then when you see a larva. Further, do not despise ground carefully searched half an hour ago. When you reach the hunting-ground, first of all, roll on the patch of plants, then sit down and eat your lunch, or smoke a pipe. When you are ready, go quietly and have another look. If the day be warm, the sun shining, you will see the larvæ walking about quite actively on the beaten-down patch.

It is curious to notice how proud a larva appears to be of a large new leaf fragment just tacked on his coat. Once or twice I have come across larvæ which systematically rejected clothing, I suppose they were uncivilized and savage individuals, or suffered from the mange. Mr. J. A. Clark, who has watched the larvæ carefully, tells me that after changing their skins, and dropping therewith their coats, they quickly reclothe themselves, and have been seen robbing their neighbours, to save the trouble, I suppose, of nibbling off new fragments. For the following notes I am greatly indebted to Mr. A. Bacot, who has been good enough to devote time and much trouble to the subject:

Ovum.—The egg (pl. vii., fig. 1) or rather empty shells, which being composed of very hard horn, retain their shape unaltered, form rather a short broad oval, much flattened on either side, measuring between ·8mm. and ·9mm. in length, by ·6mm. in width, by ·4mm. in thickness. The surface is covered with a fine but clearly marked reticulation roughly hexagonal. The gap eaten by the larva is not very regular in position. The egg-shell is semitransparent, white to the naked eye, but yellowish under the microscope. Mr. Bacot's measurements will be found to be quite in agreement with the scale upon the plate. The eggs are laid in irregular groups upon or near the terminal shoots of the food-plant—in a wild state—but in confinement on the leaves,

sides of the box, or even upon the earth. They are pale yellow at first, but become slaty-grey just previous to hatching.

Larva.—In the first instar (pl. vii., figs. 2, 3) the crescent-topped hairs arise from pronounced tubercles situated on triangular-shaped white spots. The tubercles bearing the crescent-shaped hairs are entirely distinct from, and additional to, the primary tubercles (i, ii, iii, iv, v, vi, &c.). The specialised tubercles and hairs above mentioned are situated above and behind the spiracles on the subdorsal area of the larva, on the 1st, 2nd, 3rd and 4th abdominal segments, quite at the extreme ventral posterior on the 5th, and on the dorsal area of the 8th. The spiracles on the abdominal segments 1-4 are just above the lateral flange, and the lateral flange itself is much higher up the sides of the larva on these segments than on any others, in fact it tends, on the segments in question, to be a subdorsal rather than lateral flange. On the 5th abdominal segment the white spot and specialised hair is situated on the lateral flange, on abdominal segments 1-4, both spots and hairs are well above the flange. The much greater altitude of the spots and hairs on these segments (1-4) being due, not only to the raising of the flange, but to an alteration in the position of the tubercles and hairs themselves. The white spots are not noticeable on any segments after the 5th abdominal, but there is a distinct white spot on the prothorax surrounding the spiracle, and another surrounding the base of the lateral tubercle on the metathorax, which corresponds with tubercle iii of the abdominal segments.

(To be continued.)

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

The migration of *Pyrameis cardui* occurs uniformly in the spring, during April, May, and early June. One of the earliest recorded migrations of the species took place at Turin at the end of May, 1741; others are recorded in May, 1791, May, 1798, April 26th, 1851, and again on April 26th, 1857, all in Piedmont. Near Neuchatel, in 1826, a flight was observed which lasted for at least two hours, the stream of butterflies being from two to fifteen feet broad, and the same flight was noted on the same day at Granson, in the Canton Vaud. It is described as "an immense flight of butterflies, traversing the garden with great rapidity. They were all of the one species, flying close together in the same direction from south to north, and were so little afraid when one approached that they turned not to the right or left. An interesting account of another migrating swarm of this species that took place in the early part of the summer of 1842, when the observer was stationed at Vido, a small island in the harbour of Corfu, records that the first part of the column reached the island "about 9 o'clock in the morning, and continued to advance in rolling masses of many thousands for upwards of three hours. Though the density of the column was at no time very great, yet it appeared to extend in breadth as far as one could see, having the appearance of black drifting snow, if one may so call it; by one o'clock the flight had completely passed. The wind at the time was blowing fresh from the south-east. In the afternoon, on sailing up the channel of Corfu, the traces of the passage of the flight was very evident, from the quantities of dead butterflies

which floated on the surface of the water, and, for days afterwards, they were to be seen drifting into the various bays in the island of Corfu." It was assumed, as they appeared to be taking the direction of the coast of Italy, that they would, in all probability, strike the land in the vicinity of Otranto.

Scigliana observed a great flight at Trapani in 1837; these flew in a direction from south to north. Lyell, Coni, Raconi, Ghiliana, Mina-Palumbo, and other Italian lepidopterists have recorded similar immigrations. In 1873, Failla-Tedaldi first observed one of these flights, but during April, 1878, this entomologist witnessed a tremendous immigration of this species into Sicily. It commenced on the 26th, was renewed on the 28th, and went on until May 8th. The insects proceeded in serried columns, formed of "milliers" of specimens; each column had a front of four kilomètres or more; in Cantelbuono, where the streets barred their way they ascended vertically, retook their normal direction, which appeared to be directed from the north to the south; the flight was observed in the neighbouring districts. During this time, the *Scolymus* and other plants in flower were covered with hundreds of butterflies, and some days afterwards the larvæ were obtained in numbers on several different species of plants. The observer notes that the greater part of the specimens observed were, worn, faded, and broken on the edges, and some of the examples were extremely small; the latter showed that the insects had been badly placed (owing to their great numbers) for food, and the want of proper food-plants on which to lay their eggs is suggested by Failla-Tedaldi as the cause of their migration. The spring irruption was followed by an immense number of newly emerged examples in July, evidently descendants of the immigrants.

The year 1879, will, however, long be remembered as that in which one of the greatest and most general migrations of this species occurred. A vast multitude of individuals moved from south to north over all the countries of south-western, western and central Europe, and as the main facts were collected at the time, a very fair general knowledge of the extent of the migration and the area affected was obtained. The swarm almost certainly came from north-west Africa, was observed at Algiers as early as April 15th-20th, travelling in a north-easterly direction. From April 26th-30th, Crewe observed countless numbers of the butterfly in the neighbourhood of Valencia and Barcelona, as well as in Minorca, from May 1st-3rd. Towards the end of May, the main part of the swarm appears to have crossed into France, distributing itself over the south-eastern districts of Switzerland and north Italy, and, on the morning of June 5th, thousands of living specimens were found on the snow at the hospice of St. Gothard. It then spread over Germany and Austria, being recorded from various localities from June 7th-16th. Another column appears to have crossed the Mediterranean to Sicily, and spread itself over Italy during June. The more westerly end of the swarm reached Strasburg as early as June 3rd-9th, Bisheim, June 8th, Angers and Rennes, on June 10th, arriving on our southern coasts about June 10th-13th, and spreading hence all over the country into Scotland, whilst Belgium and the country directly north were also inundated. There seems to have been many branch columns, although the greatest possibly was that which passed along the Rhine valley, where the larvæ later destroyed the crops of artichokes and *Artemisia*.

In 1880 there was scarcely a record of the insect occurring in these countries, so completely had the species, by attempting to keep up its southern habit of continuous-broodedness, exterminated itself.

As we have already stated, many entomologists recorded their observations, and so a considerable amount of evidence was forthcoming. Ritter says that he was by the edge of a forest near Nikolsburg in Moravia, on a hot sunny day at the end of May, when, at about two o'clock in the afternoon, he noticed a peculiar humming sound, and immediately afterwards observed an enormous flight of butterflies, which came in a westerly direction over an open forest park, and pitched, as if by common consent, on the sunny wall opposite to him. Hurrying off to bring others to witness the sight, he returned in five minutes, but found only one or two individuals instead of the many thousands he had left there. The swarm appeared at Treviso, north of Venice, between May 30th and June 6th. Ninni remarks that on the 30th there were comparatively few butterflies all of which were passing in a north-westerly direction; on the 31st the same condition of affairs existed, the wind at this time coming chiefly from the north; on June 1st, with the wind west of north, they moved in a direction to the east of north, and this direction they retained for the three following days; on the 2nd they came in immense numbers, flying from 5.15 a.m. until sunset, the wind varying on either side of north; on the 3rd the numbers though still great had begun to decrease; the prevailing wind was from the north-east, and they were flying directly against the wind, which had now attained greater strength; on the 4th, with the wind from a more southerly quarter, they moved in the same direction as before, but were only noticed at certain points; on the 5th, with the wind in an easterly direction, the numbers were about the same as on the previous day, while on the 6th with the prevailing wind from the north-east, the flight only began at one o'clock in the afternoon, and did not last for more than an hour and a half.

In the early days of June, and particularly about the 7th, the butterflies appeared all over the central portions of Europe, moving, as a general rule, at right angles to or against the wind, but with a prevailing direction from the south-west to the north-east. They passed over all obstacles without hesitation; thus on June 5th, as we have already noticed, thousands of them were found dead on the snow around the St. Gothard hospice, only a day or two after which they appeared in immense swarms to the north of the Alps. That it was not simply a superabundance of butterflies already existing in the region, but an influx from outside, seems to be abundantly proved by the facts, *viz.*, that *P. cardui* does not normally appear upon the wing (except perhaps a few hybernated specimens) until the middle or end of July, whilst this invasion took place at the end of May and during the first half of June; and secondly by the condition of the specimens themselves. Wherever captured all the specimens noted were worn and faded, indicating that they had flown for an immense distance. M. Oberthür, on capturing specimens of the swarm which made its appearance at Rennes on June 10th, remarked that they belonged to a very characteristic African type, noticeable from the fact that the brighter parts of the upper wings are very much paler and less rosy than in the form found in France. Indeed, he considered many to be precisely like specimens from Abyssinia which he had in his collection.

It is of course well known that *P. cardui* flies all through the winter in the north of Africa from Egypt to Algeria, laying its eggs and continuing to raise its broods during this season, and that it is usually very abundant in the imago state in March and April.

This migration was noticed as far north as the 50th degree of latitude, and an unusual abundance of the species was observed over the whole of England, Germany, Hungary, and even as far north as Finland, where all the early arrivals were remarkably worn and faded. In Würtemberg, from June 1st to 8th, a continuous and incessant stream of migrating individuals passed from the south and south-west, to the north, north-east, and east. At Wettsweil, on June 7th, it was estimated that 11,000 specimens passed an observer in the course of the day. On the same day flights were noticed at many places in south-west Germany, Switzerland, and Moravia, and near Zürich another observer estimated that 1000 passed over his head in eight minutes. On the 9th a swarm passed Morges and Lausanne, their transit occupying almost four hours. On the 10th they were seen at Carlsruhe, and on this date the migration was observed by Oberthür at Rennes, and he calculated that the butterflies moved about 50 mètres in ten seconds; sometimes twenty or thirty would be seen in a single minute following one another without interruption, sometimes four or five close together; they flew over all obstacles, passing vertically up the walls of houses in their way, always surmounting such obstacles and not passing round them. On the 11th swarms were seen at Nancy and in Savoy, at 600 mètres above the sea, and also at Salzburg. On the same day they were observed at Carlsruhe again, and at Stuttgart, and on June 14th the commune of Wetzikon (Canton Zürich) was invaded, the swarm being estimated at a kilomètre in width, and as taking two hours to pass, the insects flying from 2-10 mètres above the ground, and moving in a north-westerly direction. In Upper Austria, on June 11th, vast numbers passed incessantly from south-west to north-east, between 1 p.m. and 2 p.m. (ninety to a hundred per minute were counted in a breadth of one hundred paces), whilst still more to the west, at Geneva, a swarm is reported to have obscured the sun for several minutes, and on the 8th, at Bisheim, in Alsace, they were also so abundant that the light was partly obscured. Still farther west, and going back in point of time, from June 3rd-9th, great swarms were observed flying northwards at Strasburg, whilst at Angers, on the 10th, myriads passed from east to west against the wind, travelling at a little distance above the ground. On the 10th the insect appeared in great abundance in England, and about the same time in Belgium. On the 12th it was observed at Lautschitz, in Bohemia, on the 15th at Augsburg, and again at Salzburg, passing between four and five o'clock in the afternoon, at the rate of about 750 butterflies in an hour. Streams of them were noticed every day from the 10th to the 16th, near Paris, being especially abundant on the 15th. After this date the observations chiefly refer to the localities in which various parts of the migrating broods had settled.

There can be no doubt that our British visitors were part of the great flocks that were observed in the act of dispersal at this time. How far these reached to the south and east was not ascertained, but a Painted Lady was seen at the time sunning itself on the bare rocks in the Great Desert of Nefud in Central Arabia, "at least 400 miles from any place where the larva could have fed up."

Wolfe notes an immigration on June 7th, 1899, into south-western Ireland, and for days afterwards they were in great numbers, thousands having appeared to arrive simultaneously. Larvæ were abundant in July, and pupæ also, yet there was no great number noticeable in August, and Wolfe suggests that some strange instinct caused most of those that emerged to leave. The eggs that were laid in August provided full-fed larvæ in September, so that the continuous-brooded habit was as usual quite evident in the progeny.

Of the abundance of *P. cardui* in the countries bordering the shores of the Mediterranean, Eaton writes (*Ent. Mo. Mag.*, vol. xxx., pp. 98, 133), that at the base of the Azures and south of the Hodna in eastern Algeria, the Ziban, with Biskra as the chief town, forms the northern border of the Sahara. At the end of March, 1894, a spell of cool weather (with snow on the mountains northward) was followed at Biskra with a rise of temperature, and *P. cardui*, which had not hitherto been commoner during the winter than tortoise-shells in England are apt to be in early spring, increased rapidly in numbers daily, until the butterflies became as plentiful as Garden Whites in June over a cabbage plot or Meadow Browns in a well-stocked hay-field. A certain proportion of this increase in population was undoubtedly due to some bred in the vicinage, because specimens were seen brightly coloured and in fine condition amongst the faded and worn, and a cripple was observed one day with its wings not fully expanded. But the greater number must have wandered hither with the wind from southern districts to loiter in the welcome shelter of hillsides and hollows. They laid their eggs in various places. By April 11th the species (though still very common) was in diminished numbers, perhaps through dispersion over the district or perhaps through emigration. By May 4th the imagines were abundant once more, frequenting the blossoms of many kinds of plants in the desert and crowding to the bushes of *Tamarix brachystylis*, now in flower along the Aned Biskra above the barrage. They were not noticed to be ovipositing, and Eaton suggests that perhaps they were awaiting a sirocco to waft them to the highlands of Constantine and Sétif, if not to Europe.

This cosmopolitan butterfly is not only a migrant in Europe, but Bowles relates (*Canadian Ent.*) that the species also migrates in North America, and instances the year 1865 or 1866 as one in which a migration took place in the neighbourhood of Quebec. For many years it had been quite absent in that district, until, one summer, it suddenly became the commonest butterfly in the neighbourhood. The next year it was again absent, and it did not reappear for many years. Franham gives (*Ent. News*, vi., p. 150) an account of a swarm of *Pyrameis cardui* observed in California and Nassig, and passing from north to south, in April, 1895. He estimated that from 9 a.m. until noon some 200 butterflies passed per minute, in a lane about 80 rods long; at 2 p.m. about 50 passed in that time; but at 4 p.m. only an occasional specimen was seen.

It is interesting to recall the fact that the common thistle on which the caterpillars of this butterfly chiefly feed is also a notable migrant, and to note that during recent years the thistle has widely spread, and that great thickets of this plant are now to be found in various parts of North America, where it has often ousted the native weeds. It would appear that, as the boundaries of the insect's roaming capa-

bilities are only determined by the existence of its food-plant, the establishment of the Painted Lady as one of the prevailing species of its race is assured. This is intensified by the fact that, although the thistle is the chief, it is by no means the only, food of the caterpillar, which will thrive on many other common plants of widespread distribution.

COLEOPTERA.

Anthonomus rufus, Schoen., an addition to the British List.

Anthonomus rufus, Schön., iii., p. 347, 21, des Loges, "Ann. de la Soc. Ent. de Fr.," viii., 1896, p. 436. This species can only be mistaken for *A. pedicularis*, L., on account of its comparatively simple anterior tibiæ, but may be known from it thus:

A. Posterior femora toothed .. .. .. *A. pedicularis*, L.
B. Posterior femora without teeth .. .. *A. rufus*, Schön.

M. des Loges (l.c.) says that it is found over the greater part of Europe, and mentions England, but hitherto there have been no records of its capture in this country. He says he has taken it on the flowers of the sloe in the spring. He says that it appears to be confounded in collections with *A. ulmi* and *A. pedicularis*, but is easily distinguished by its smooth and very cylindrical rostrum. This, however, does not seem to be a very reliable character, as it is evidently sexual. I have examined several continental males, in which it was not at all marked, and a very typical female in which it was very much so. It cannot, however, be confused with *ulmi*, as I have already pointed out, on account of its comparatively simple anterior tibiæ, and with *pedicularis* by its not possessing any teeth to the posterior femora. I introduce the species on a specimen taken by Mr. W. H. Bennett, of Hastings, in his district. I have also seen a second specimen, taken by Professor Beare, in the same locality.—H. St. J. K. Donisthorpe, F.Z.S., F.E.S., 58, Kensington Gardens, S.W.

Anthonomus rufus, Schön., at Fairlight.—On June 19th, 1892, I beat a little *Anthonomus* from blackthorn, which seemed strange to me. At first I thought it might prove to be *A. brittanus*, but I could not make it agree with that or any of our other species. The specimen went the rounds of most of our leading coleopterists, with no definite result, and it was ultimately put on one side. There it remained, until in 1899 I was collecting at the same place with Professor Beare. We were looking for *Cissophagus hederæ*, and under the bark of some old ivy Professor Beare took a little weevil hybernating, which I at once recognised as my old friend. I then sent it to Mr. Donisthorpe to see if he could make anything of it, and he now informs me that it is *Anthonomus rufus*, Schön., a species not previously recorded from England.—W. H. Bennett, F.E.S., 15, Wellington Place, Hastings.

Coleoptera in the Cumberland Pennines.—Snow still lay on the mountains, when, on May 6th, I penetrated into the Pennines to renew my acquaintance with some of the beetles which have their habitat in these wild, little visited regions. I was fortunate in having the company of two lepidopterist friends, whose own captures, though of considerable interest, were not extensive, and who very kindly took to beetle-hunting,

thereby adding largely to my own captures. Leaving Carlisle at 7 a.m., we, two hours later, were breasting the side of Castle Carrock, a long fell with a broad top, having an altitude rather under 2000ft. This is the most western of the Pennines in Cumberland, and is in fact detached from the range proper by a deep valley, down which the Gelt stream flows. Work in the mountains is largely confined to stone-turning, and I always find that the best collecting is to be had by following the "stone dykes" which divide the land, along which there are invariably plenty of flat stones lying on the ground. Striking such a "dyke" at the northern summit of the fell, we worked along the broad ridge to the higher summit at the southern extremity. *Bradycellus similis* and *cognatus* abounded under every stone, but the rare *collaris* only turned up once. I have only taken it once before—on Skiddaw. *Calathus micropterus*, though tolerably abundant, was not taken so freely as on my visits last year. This is, as yet, the only place where I have noticed it, but in this county of mountains and high moors, it is bound to occur elsewhere. The first *Carabus* to turn up was *catenulatus*, always a common species on these hills; then came *glabratus*, always a welcome capture, and never common—I can never get more than one a day; then *arvensis*, rather a scarce insect with me, but widely spread, and last, though choicest of all in my eyes—*nitens*. I had never before seen this in Cumberland, but had it brought to me last summer from Westmorland. Stephens, in his "Illustrations" records it from Carlisle, but does not state the precise locality. I got two fine specimens and the remains of a third, so hope it is fairly established here. *Cymindis vaporariorum* was quite absent on this visit, indeed two specimens are all that have been taken on this fell. *Olisthopus rotundatus*, *Patrobus assimilis* and *Amara lunicollis* were more or less common with other things. *Pterostichus vitreus* was almost a pest, and the rare *aethiops* was boxed five or six times; its congener *madidus* is almost as rare on this fell, while among the Lakeland mountains it abounds, and I have not been able to detect *aethiops* there at all. An hour's work with the water-net in a mossy pool showed up several species, the most noteworthy being *Hydroporus morio*, which was common. I was especially on the lookout for *Lathrobium atripalpe*, and was fortunate enough to secure four examples, which make it evident that it is fairly well established in east Cumberland. These were all found under stones, where also *Quedius boops*, *rufipes*, *Mycetoporus lepidus*, *Philonthus splendens*, &c., occurred. In dung *Aphodius lapponum* was the best thing. Descending to the bed of the stream, I was in hopes of getting other things, but after noticing *Nebria gyllenhali* and *Bembidium tibiale*, a drenching rain came on, and we had reluctantly to beat a retreat, but ere we reached civilisation we were nearly drowned, indeed, as one of my friends remarked, the *Hydroporus morio* in the bag on my back would almost fancy themselves in their natural element! The weather among the mountains is certainly rather trying, but in spite of all, the exhilarating exercise, the bracing air, the wild freedom, and—the choice beetles lure one back with a magnetic influence, which, to my mind, there is no restraining.—FRANK H. DAY, F.E.S., Carlisle. *May 17th*, 1900.

ORTHOPTERA.

Note on the Geographical Distribution of the Eumastacidae.

By MALCOLM BURR, F.Z.S., F.E.S.

Having recently had occasion to study in some detail the insects of this family, I have been much struck with their geographical distribution, and a few notes on this point may be of interest.

The *Eumastacidae* are a family of the *Acridiodea*, well marked, it is true, but showing affinities with the *Proscopidae* and *Pneumoridae*, both exceedingly restricted in distribution, and presenting certain analogies with the *Tettigidae*. They are all very peculiar in form, and afford some very striking examples of mimicry and adaptation to their surroundings. About a hundred species are known to science, but none are very common ; new species are continually coming to hand, in fact, about two years ago scarcely more than thirty species had been described ; they do not appear to be common anywhere, and are rare in collections. With a few exceptions they are confined to the tropics. Roughly speaking, from a geographical point of view, they fall into three groups, the Oriental, the Ethiopian, and Neotropical. We will now consider them more in detail.

The first group, *Choroetypi*, contains several genera in which the pronotum is greatly compressed and elevated, recalling certain *Tettigidae* and *Membracidae*. They were at first considered to be essentially Oriental, but recent discoveries have brought to light a number of African forms. The genus *Choroetypus*, Serv., is found in India, Borneo, and Java. *Phyllochoreia* appears to be confined to the Malabar coast and to Ceylon. *Scirtotypus*, Br., is more widely spread ; three species are known, occurring respectively in Borneo, west Africa, and Ceylon. The two species of *Orchetypus* are confined to Ceylon. The genus *Plagiotriptus*, which is close to *Choroetypus*, is exclusively African, but one small species is found in Sokotra, which appears to be a stepping stone to the Oriental region ; an intermediate monotypic genus, *Phanlotypus granti*, Burr, seems to be peculiar to that island. Thus it will be seen that, with a few exceptions, the *Choroetypi* are an Oriental group.

The next group, the *Erianthi*, are also Oriental, but their distribution just reaches the confines of the Australian region. *Erianthus* is widely spread throughout the Oriental region, *Eupatrides* in Borneo, *Bennia* in south China, while *Adrapetes* is found in New Guinea. This, therefore, is also an Oriental group.

The *Gomphomastaces* comprise one anomalous genus ; four species are known, of which two occur in the Punjab and in Kashmir, while two others are found in central Asia, within the usually accepted limits of the Palæarctic region. In their form as well as in their distribution, they are exceptional among the *Eumastacidae*.

The *Erucii* again are essentially Oriental ; *Erucius* contains several species found in Sumatra, Borneo, the Philipines, and Java ; *Mnesicles* has the same distribution, and *Mastacides* consists of two small apterous forms, occurring in southern India. *China* is a monotypic form occurring in southern China.

The above mentioned groups, then, may be regarded as characteristic of the Oriental region, although certain forms slightly overstep the limits.

We will now consider the American species. One monotypic genus, *Morsea*, Scudd., is found in California, but the other groups, *Episacti*, *Enmastaces*, are essentially Neotropical. A good number of species are known, distributed through about half-a-dozen genera, but all are confined to the Neotropical region, extending from Guatemala to Paraguay. They appear to be most numerous in the neighbourhood of the Upper Amazons, in Peru and Ecuador.

The last great group, the *Thericleis* is again essentially Ethiopian. About eight genera are known, all confined to tropical Africa, including Sokotra and Madagascar. Except *Cymatopsygma flabelliferum*, K., none are capable of flight, and many are totally apterous. *Macromastax* is found only in Madagascar, but the other Malagasy genera are well represented on the mainland. The only other group represented in Africa is, as we have seen, the *Choroctypi*, and of that only two genera are peculiar to the region.

To sum up, we find that (1) the Oriental region contains exclusively the *Erneii*, it has also the *Gomphomastaces* straggling into the Palæarctic region, the *Erianthi* straggling into the Australian region, and *Choroctypi* with two genera in the Ethiopian region. (2) The Neotropical region has a monopoly of the *Episacti* and the *Enmastaces*, except one genus straggling into the Nearctic region, and no other *Enmastacidae* are found in the New World. (3) The Ethiopian region has a monopoly of the *Thericleis*, and also has two genera and one odd species out of the typically Oriental group *Choroctypi*.

Myrmecophilous Orthoptera.

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

According to Wasmann all the true myrmecophilous Orthoptera belong to the *Gryllodea*, though there may be some myrmecophilous species in the *Phaneropteridae*. Many species of *Blattodea*, such as the North American *Temnopteryx deropeltiformis*, Brunner, are found in the company of ants, but it is doubtful if they are truly myrmecophilous. The following is a list of the species that frequent ants' nests.

Myrmecophila acervorum, Panz., is found in the adult state (♂s and ♀s) in middle Europe with *Formica fusca*, *F. sanguinea*, and *F. sanguinea* with *F. fusca* as slaves. It is also found with *Lasius niger*, *L. alienus* and *Myrmica lacrinodis*. The quite young larvæ have been found with *Tetramorium caespitum*. In south Europe and north Africa it has occurred with *Aphaenogaster testaceopilosa*, *Camponotus lateralis* and *C. dichrous*. A variety occurs in India with *Bothroponera sulcata*, where also the var. *flavocincta*, Wasm., is found with *Plagiolepis longipes*. Mr. Burr calls attention to the fact (*Ent. Record*, 1899, p. 187), that Westwood recorded this insect from Netley, where it had been taken in moss, but that further evidence is necessary to confirm it as British. Myrmecophila ochracea, Fisch., is found in southern Europe and North America with *Aphaenogaster barbara*, and its very young larvæ with *Pheidole pallidula*. Myrmecophila salomonis, Wasm., has been recorded with *Monomorium salomonis* from Tunis. Myrmecophila pergandei, Brun., occurs in Columbia in the adult state with *Formica fusca* var. *subsericea*, and also with *F. integra*, *F. pallidefulva*, *Camponotus marginatus* and *C. mellens*, and its larvæ at various stages with *Cremastogaster lineolata*, and more seldom with *Aphaenogaster tenessensis*.

Myrmecophila formicarum, Scudder, is taken with *Camponotus laevigatus*, in California. Myrmecophila oregonensis, Brun., is found in British Columbia, &c., with *Formica neorufibarbis*. Myrmecophila nebrascensis, Brun., has been recorded with *Formica rufa* in Nebrasca (it is, however, probably not *F. rufa*, as that species is apparently unknown in North America, but one of its allies), and under stones with *F. exsectoides*, in New Mexico. Myrmecophila nehawkae, Scudder, is a very small species occurring with *Cremastogaster lineolata*, in Nebrasca. Myrmecophila columbiana, Sauss.—Mr. Burr possesses a specimen of this species from Columbia, but I do not know the name of its host. Myrmecophana fallax, Brun., is probably myrmecophilous, but its host is unknown. This insect which is figured in the *Cambridge Nat. Hist. Insects*, pt. i., p. 323, bears an extraordinary resemblance to an ant, when viewed from the side. There do not appear to be any British records of Orthoptera taken with ants.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Eggs of Lepidoptera.—*Larentia nobiliaria*.—Oval, of ordinary Geometrid shape; length: breadth: height, as about 8 : 5 : 4; colour pale straw-yellow, depressed on upper surface; sculpturing very faint, consisting of fine irregular polygonal pittings without any very definite walls to the polygonal spaces to form a reticulation (Described August 2nd, 1899, from eggs laid by a ♀ captured at Simplon the preceding day).

Setina aurita.—The most regular appear to be rather more than a hemisphere in shape, with the base almost perfectly flat (others are somewhat irregular owing perhaps to being pushed against others at time of laying); they are of delicate texture, pale brown in colour, mottled with darker brown (=embryo); the surface apparently quite smooth and shiny, with only the faintest indication of vertical ribbing at the rounded edge of the base; the whole egg is very transparent, and shows clearly the granular contents (Described August 4th, 1899, from eggs laid by female on setting-board, July 31st, and captured at Simplon).—J. W. Tutt.

Newly hatched larva of Agrotis agathina.—Young larva (hatched September 19th, 1898) whitish-fuscous; loops, but legs on the 3rd and 4th, though smaller than those on 5th and 6th, abdominals, and not used when running quickly, are functional, and are used when moving slowly; when at rest the larva may use them or may sit up Sphinx fashion. The crochets on prolegs on the 3rd, 4th, 5th, 6th, and 10th abdominal segments are respectively 6, 8, 9-10, 10, 9-10; the crochets are smaller on prolegs of 3rd and 4th segments.—T. A. Chapman.

SCIENTIFIC NOTES.

Thyreosthenius biovatus in nests of Formica rufa, and Tetrilus arietinus in nests of F. rufa and Lasius fuliginosus.—Since my former note (*antea*, p. 138) was written, I have again received *T. biovatus* (both sexes adult) from Mr. Donisthorpe, by whom they were found in nests of the same species of ant (*Formica rufa*) at Oxshott. Also from the same locality an adult and an immature male of a most remarkable spider of the family *Agelenidae*, *Tetrilus arietinus*, Thor. One of these

examples was domiciled in the nest of *F. rufa*, the other in that of *Lasius fuliginosus*. This spider was first described, from ants' nests, in Sweden, by the late N. Westring, under the name of *Hahnia pratensis*, C. L. Koch. Dr. T. Thorell includes it (*Syn. Europ. Spiders*, p. 165) in his genus *Cryphoeca*. M. Simon, however, distinguishes it from this genus, and makes it the type of group A of his genus *Tetrilus* (*Hist. Naturelles des Araignées*, 2nd ed., 1898, p. 269). The palpal development of *Tetrilus arietinus* (♂) is among the most extraordinary of the multitudinous forms of that part of their structure among the Araneidea. This is its first record as a British spider.—Rev. O. P. Cambridge, M.A., F.R.S., Bloxworth, Dorset. *May 9th*, 1900.

Listrodromus quinqueguttatus, Grav., bred from Cyaniris argiolus.—On September 4th last I found five larvæ of *Cyaniris argiolus* feeding on the buds of ivy bloom, in a garden near Chalford, in Gloucester. They all pupated on the 6th and 7th of the same month. On April 16th one male emerged, on the 27th a female, whilst on the latter date a third pupa produced an ichneumon. On April 28th the two remaining pupæ produced similar ichneumons, all females. These were sent in due course to Mr. Morley, and he now reports as follows: "The specimens sent are *Listrodromus quinqueguttatus*, Grav., ♀. Gravenhorst first described the ♂ (*Ichneumonologia Europaea*, i., 626) under the name *Ichneumon quinqueguttatus*, and the ♀ (*loc. cit.*, 399) under the name *I. nycthemerus*. Under the latter name Desvignes (*Cat. Ich. in the British Museum*) again described the ♂ in 1856. Wesmael (*Tentamen=Nouv. Mém. Ac. Brux.*, 1844, p. 146) added somewhat to Gravenhorst's description of the ♀, and created the subgenus *Listrodromus*, which he supplemented and also figured in *Bul. Ac. Brux. Annexe*, 1853-54, p. 139, pl. ii., fig. 13, and surmised that *quinqueguttatus* was its ♂. It appears to be a very rare insect throughout Europe (though I cannot vouch for its continental occurrence during the last ten years). Gravenhorst knew only one ♀, which he first described in his *Monographia Ichneumonum Pedemontanae Regionis* (1820). Wesmael says it is very rare in Belgium, where he had not (in 1853) seen a specimen for 30 years, and the three ♀ ♀ previously taken were from the vicinity of Brussels. Bridgman and Fitch, in their papers on Ichneumons (*Entomologist*, xiv., p. 132), give a meagre description, and seem to know it only from Desvignes' specimens (both ♂ and ♀) as British, having never met with it themselves. I am consequently glad to find that Bignell (*Trans. Dev. Ass.*, 1898) had once bred it—and from the same host—on July 14th, in south Devon, though which sex is not stated. I fear you have not also bred the ♂—which among other points may be distinguished by having the posterior tibiæ for the most part yellow, not red—with the ♀? This would be most interesting."—(Mrs.) Mary B. Redmayne, Chetwynd Place, Lichfield. *May 20th*, 1900.

VARIATION.

Aberration of Euchloë cardamines.—I have just bred a male *Euchloë cardamines* with a conspicuous black spot in the centre of each of the lower wings. I have never noticed this peculiarity before.—W. H. Harwood, Station Road, Colchester. *May 8th*, 1900.

Aberration of Lachneis lanestris.—The imagines of *Lachneis lanestris* that I have recently bred are, on the whole, most constant in their markings, the spots in some instances are not so well defined, but in every specimen they are present, as well as the lines, with one exception, *viz.*, that of a female, in which the basal white spot on the left wing is conspicuous by its absence.—A. Russell, F.E.S., The Limes, Southend, nr. Catford, S.E. *May 7th*, 1900.

NOTES ON COLLECTING, Etc.

The food-plants of Oxyptilus distans, Z. (= lætus, Z.).—Mr. E. A. Atmore asks (*ante*., p. 135) whether the food-plant of *Oxyptilus distans* is known. So far as I am aware, the only plant from which this species has been actually bred is *Andryala sinuata*, on the flowers of which the larvæ were found by M. Millière (cf. *Ent. Mo. Mag.*, vi., p. 36, 1869). I have not Millière's description at hand, but Mr. J. H. Leech, in his *British Pyralides*, p. 57 (1886), gives the larva, on Millière's authority, as "bone-coloured, hairy, with a small blackish head and divided dorsal plate." *Andryala sinuata* is unknown in Britain, and the larva in England, as well as in some of its continental localities, obviously feeds on one or more other plants. It is generally supposed that *Hieracium* is among the favoured genera, and such evidence as that of Mr. Sydney Webb, who says, in the *Young Naturalist*, x., p. 43 (1889), that the moth was "so evidently attached to *Hieracium pilosella*, occurring only where that plant was growing in patches on one hill slope," makes it almost certain that *H. pilosella* is its food-plant in some of its haunts. Sorhagen, *Kleinschmett.-d.-M.-Brandenburg*, 3 (1886), suggests, as another probable food-plant, *Ononis spinosa*, round which, he says, the imago flies in sandy spots in May (end), June, and August. I earnestly hope that Mr. Atmore will shortly discover the larva in his neighbourhood, and will let us know upon what plant it there feeds.—Eustace R. Bankes, M.A., F.E.S., Norden, Corfe Castle. *May 18th*, 1900.

Porthesia chrysorrhœa in north Essex.—It may interest you to hear that I found a large brood of *Porthesia chrysorrhœa* at West Bergholt a few days ago. This is the first brood I have seen in the spring for many years, though I discovered a very small brood in the autumn of 1898 near Little Horkesley Church. These, unfortunately perished during the winter.—W. H. Harwood, Station Road, Colchester. *May 8th*, 1900.

Triphæna pronuba in April.—While looking at some sallows at Streatham, on April 18th this year, I saw a *Triphæna pronuba*. In the *Entomologist's Record*, iii., p. 16, Mr. Bond-Smith mentioned that he had observed a second brood of this species, and as it seems too early for the emergence of this insect I thought it might be a hybernated specimen of a second brood.—R. C. Paton, Ormley, Glen Eldon Road, Streatham. *May 3rd*, 1900. [The larvæ of many species of Noctuid moths that should normally hybernate in this state will, in confinement, feed up rapidly in autumn if exceedingly well placed, and produce, or attempt to produce, a late autumnal or winter brood. *Apamea oculta* and other species will occur to most lepidopterists. Undoubtedly this occasionally happens in nature, such go-ahead individuals being, however, usually exterminated. One can readily imagine

that occasional individuals do get through, and we should rather suspect this to be the case with the *T. pronuba* observed than that it was an autumnal example that had over-wintered as an imago.—Ed.]

Distribution of Trichiura crataegi.—There is a single record in the books of the South of Scotland Entomological and Natural History Society of the occurrence of *Trichiura crataegi* in the larval stage in this district many years ago. An imago was bred, and is in the possession of Mr. Pringle, of this town; the larva was taken feeding on heather on the Fair Hill.—J. C. Haggart, 58, St. Andrew Street, Galashiels, N.B. *May 4th*, 1900.

PRACTICAL HINTS.

Field Work for June and July.

By J. W. TUTT, F.E.S.

1.—The imagines of *Psodos coracina* fly by day in July in the sun, on the grassy slopes of our Scotch mountains at a considerable elevation.

2.—*Melanippe hastata* flies at noon in June, over the wettest part of Orton Moss, it is slow on the wing, and easily captured (Armstrong).

3.—About the middle of June (June 15th), in the evening, wet or dry, *Dianthoecia conspersa* will take wing, quick in motion, but not flying far, and dropping soon on the flowers of *Lychnis flos-cuculi* (Armstrong).

4.—About June 20th search for larvæ of *Actebia praecox*. They feed on sallow at night, and hide themselves beneath the surface of the sand during daytime, whence they have to be brought out by raking about the roots of the food-plant.

5.—The imagines of *Semasia spiniana* fly in June in the afternoon sunshine around and above hawthorn hedges. May often be obtained abundantly in the morning, by beating into an umbrella.

6.—In July a visit to the New Forest should give, among others, the following larvæ—*Amphidasys strataria*, *Notodonta trepida*, *N. chaonia*, *N. dodonea*, *Lophopteryx camelina*, *Stauropus fagi*, *Cidaria psittacata*, *Panolis piniperda*, whilst larvæ of the red form of *Taeniocampa gracilis* may be obtained from bog-myrtle by searching.

7.—Kick the stems of young oaks in those parts of a wood free from undergrowth. Then look carefully at everything that falls—*Cochlidion avellana* (*limacodes*) comes down half falling, half flying.

8.—The egg and young larva of *Lophopteryx cucullina* must be searched for in the middle of July, on chalky hillsides sloping to the north, in the densest shade of beech woods, on stunted maple bushes, and often within a few inches of the ground. A likely bush for the larva may be known by the blotches on the leaves, caused by the larva having eaten, when young, the under surface of the leaf (Bernard-Smith).

9.—During July search *Ononis arvensis* for the larvæ of *Heliothis peltiger*. They prefer the flowers and green seed-pods.

10.—Collect during July and August the seed-heads of the white

campion for larvæ of *Dianthoecia capsincola* ; the larvæ often have their bodies hanging half-way out, and round holes in the capsules denote the affected ones.

11.—During the first fortnight of July visitors to the south-west coast (Lizard, &c.) should look out for *Sesia philanthiformis* flying along the flowery earth-walls, and settling on the thyme and seathrift. *S. ichneumoniformis* is also there at the same time. Both fly in the bright sunshine, and prefer the morning sun.

12.—At the end of July collect the seedheads of the common blue-bell (*Scilla nutans*) for larvæ of *Eupoecilia maculosana*. It is necessary to open the seed-vessels to find them, as the larvæ give no outward indication of their presence.

13.—In July and August collect the flower-heads of *Centaurea scabiosa* on the coast between Deal and St. Margaret's Bay. Keep in band-box, and you will breed plenty of *Conchylis alternana*.

14.—The larva of *Conchylis straminеana* feeds in July, and again in September at the base of the flower heads of *Centaurea nigra*, eating the young seeds, and lying curved in the cavity formed, or (if disturbed) retreating into the stem (Barrett).

15.—The larva of *Eupoecilia atricapitana* feeds in July (second brood) within the growing stems of *Senecio jacobaeae*, eating the pith and stopping the growth of the central shoot so that it becomes thickened and covered with a bunch of leaves, while the side-shoots grow up past it (Barrett).

16.—The green, semitransparent larva of *Gracilaria populetorum* feeds in July, making a cone of an entire birch leaf.

17.—The green larva of *Depressaria capreolella* feeds in July, in the leaves on the higher shoots of *Pimpinella saxifraga*.

18.—The larvæ of *Eupithecia venosata* feed during July inside the capsules of *Silene*, much in the same manner as the Dianthœcias.

19.—In July the imagines of *Collix sparsata* (York, Wicken, New Forest, &c.), swarm at early dusk, flying about the buckthorn bushes with *Scotosia rhamnata*.

20.—The imagines of *Epione apiciaria* always used to occur in abundance late at night (11 p.m.-12 p.m.) round sallow bushes in Wicken, in late July and early August. We used often to make up a bag with this species on the way home.

21.—During July and August be sure to fill a linen bag or two with capsules of *Silene*. They should be transferred to band-boxes later.

22.—From solitary flower heads of foxglove in open spaces in woods, the larvæ of *Eupithecia pulchellata* may be obtained in the spun up flowers in July.

23.—After a dry, hot day in July, if there be the slightest trace of dew, *Nudaria senex* may be found in its marshy haunts, just before dusk, swarming. We have seen them in hundreds crawling up the grass and rushes, then fluttering off, threading their way among grass and rushes for about half an hour. After that their flight is over.

24.—On rough heath-covered ground at a moderate elevation where there is an abundance of bare rocks *Dasydia obfuscata* is found in July, resting on the lee side of the rocks, and creeping into the shelter of any overhanging part.

25.—In late July and early August, cut down reeds with a yellow central shoot for pupæ of *Nonagria geminipuncta*.

26.—Search trunks (near roots) of poplar trees in July for newly-emerged *Trochilium apiforme*.

27.—In collecting *Agrotis lunigera* sugar the thistle-heads and other available plants along the edge of the cliffs. Best time, from the middle of July to the middle of August.

28.—*Agrotis agathina* larvæ full-fed on ling, June 23rd; imagines found *in copulâ* September 23rd. Other females laid ova on September 13th (Kane).

29.—*Holomota grandaevana* flies at the end of June and during July, at dusk, with a jerky flight of a few yards, very close to the ground. They can be taken more freely by looking over the leaves of the coltsfoot with a lantern, generally sitting on the top of the leaves of the smallest and most stunted plants (Gardner).

30.—*Crambus furcatellus* was flying not uncommonly on June 21st, on the grassy slopes between Sprinkling and Styehead tarns, and was, in fact, found on almost every high hill ascended (Geldart).

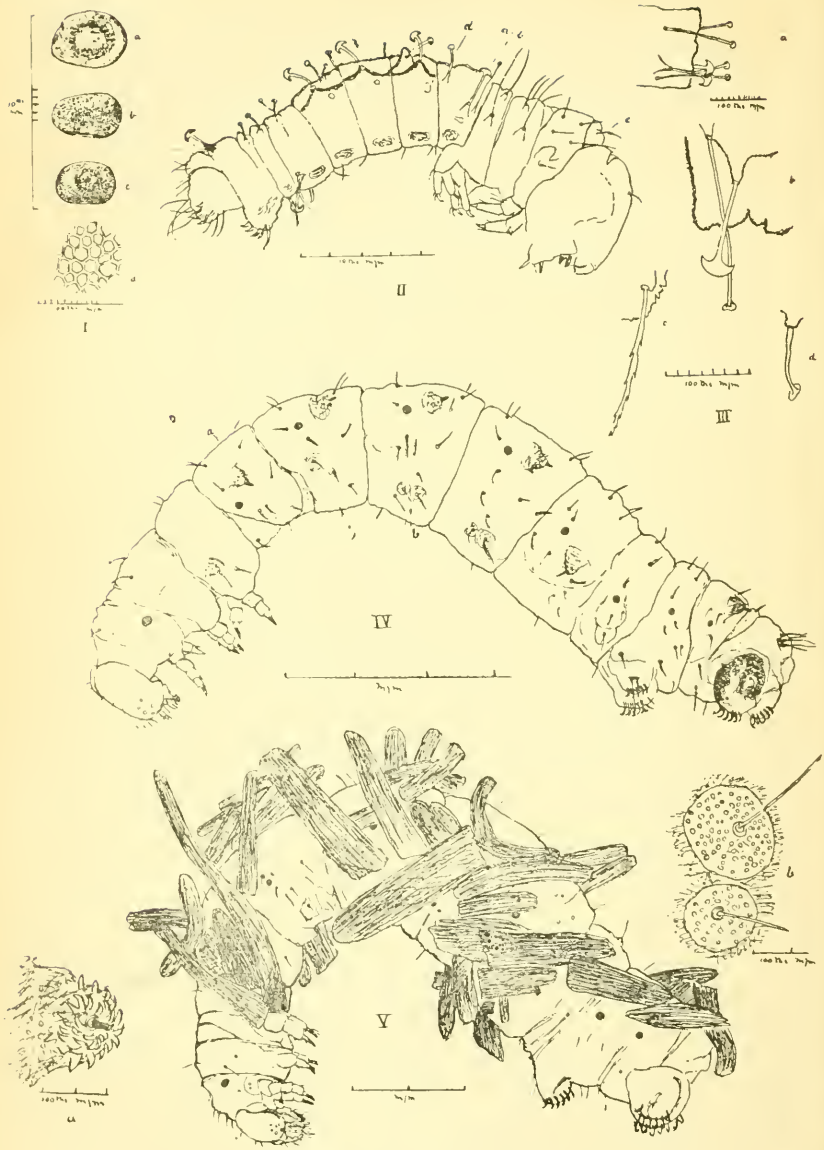
N.B.—Hundreds of similar "Practical Hints" referring to a very large portion of the British Lepidoptera, have been printed in the preceding volumes.

CURRENT NOTES.

Lord Walsingham describes (*Ent. Mo. Mag.*, p. 106) a new *Eriocrania*, under the name of *E. fimbriata*. The species is founded on two specimens taken by Mr. Hamm, near Wellington College station, on April 14th and 21st, 1894. The species is very easily recognised by its unicolorous bronzy-golden forewings and almost white cilia, which contrast strongly with the ground-colour of both the fore- and hindwings.

The Rev. F. D. Morice adds (*Ent. Mo. Mag.*, p. 107) *Ellampus truncatus*, Dahlb., to the list of British Chrysids, from a specimen in the "Walcott collection," located in the Cambridge University Museum. The specimen is labelled "British—Walcott," but there are no further data, and the precise locality is unknown.

Dr. Heylaerts (who has Millière's original types) confirms (*Ann. Soc. Ent. Belg.*, p. 189, May 14th, 1900) Dr. Chapman's discovery (*antea*, pp. 86-87) that *graecella*, Mill., is a *Psychidea*, and not a variety of *Epichnopteryx pulla*. He further names the Esterél examples of *E. pulla* (which Millière incorrectly referred to *P. graecella*), calling them var. *montanella*. We are quite at a loss to understand his further action of renaming Rambur's genus *Psychidea*, of which *nudella* (described by Rambur as *pectinella*) is the type. This he does, calling it *Rebelia*, which necessarily sinks as a synonym of *Psychidea*. This multiplication of synonyms is to be regretted, and as Dr. Heylaerts' had our paper on the subject as early as last March, this, at least, could readily have been avoided. Heylaerts also names Zeller's Bergün specimens of *E. pulla*, calling them var. *montana*. There are many of these in the "Zeller collection," in the British Museum, and these are quite indistinguishable from some of the original examples of var. *sieboldii* in the same collection, before which var. *montana*, therefore, necessarily falls.



Phorodesma smaragdaria, Fabricius.

The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XII. No. 7. July 1st, 1900.

Phorodesma smaragdaria, Fabricius (*with Plate*).

By Rev. C. R. N. Burrows

(*Concluded from p.* 154.)

The larva in hybernating stage or one moult later (pl. vii., figs. 1-5). The spiracles are clear and distinct in the unclothed larva; of large size, dark mahogany-brown with raised chitinous walls; that on the prothorax is rather larger than those on the remaining segments; in position the spiracle on the prothorax is about midway between dorsal and ventral margins and close to the posterior margin of the segment. On the 1st abdominal segment the spiracles are situated midway up and towards the anterior margin, the special tubercle (figs. 4*a*, 5*a*) not quite so far above the spiracle as iii (supraspiracular), and slightly posterior to the latter. On the 2nd abdominal segment the spiracle is well up towards the dorsal area, and still slightly towards the anterior margin: tubercle iii is only a short distance above and to the front of spiracle; the special tubercle is slightly higher up than tubercle iii and rather more posterior than iii is anterior to the spiracle. On the 3rd abdominal segment the spiracle is slightly higher up than on the 2nd; iii (supraspiracular tubercle) is still anterior to, and only very slightly above, the spiracle; the special tubercle is slightly higher above iii than it was on the 2nd abdominal segment, and is nearly midway between the spiracle and the posterior margin of the segment. On the 4th abdominal segment the positions are almost the same as on the 3rd, but the spiracle is just a trifle lower and iii a trifle higher above it, than on the 3rd abdominal segment, the special tubercle is slightly more posterior. On the 5th abdominal segment there is a very marked change—the spiracle has dropped until it is only slightly nearer the dorsal than ventral margin, tubercle iii is almost vertically above the spiracle, whilst the special tubercle is well below the spiracle almost in the same plane with v (one of the subspiracular tubercles) which is nearly in vertical line beneath the spiracle, and well posterior to the spiracle, and almost directly above iv. On the 6th abdominal segment the spiracle is almost exactly central, the dorsal tubercle ii is well outside and only slightly behind i, tubercle iii is directly above the spiracle and nearly in perpendicular line beneath ii, iv has moved up directly posterior to spiracle, v is well below and slightly posterior to spiracle; there is no special tubercle on this segment. On the 7th abdominal segment the positions are not greatly

altered, the spiracle is slightly higher again, dorsal tubercles i and ii in about the same position, iii directly above and v directly below the spiracle, iv is slightly beneath and slightly posterior to the spiracle, iii, iv and v are all close to the spiracle, whilst there is no special tubercle on this segment. On the 8th abdominal segment the spiracle is rather higher up towards the dorsal margin, i and ii are not clearly defined, iii is directly above, and v directly beneath, iv also is beneath the spiracle and above v, but slightly posterior to them; the special tubercle is right up on the dorsal area, a long way from the spiracle and posterior to it. The 9th abdominal segment is a mere slip between 8 and 10, and might be readily passed over as a subsegment of either. The 10th abdominal is made up almost entirely of the anus, anal flap, and anal claspers.

From the above it will be seen that the special tubercles are situated only upon the 1st, 2nd, 3rd, 4th, 5th, and 8th abdominal segments. The tubercles and hairs on the prothoracic segment are in a double row or band transverse to the length of the larva. On the meso- and metathorax the dorsal tubercles approximate to a single transverse line. On the abdominal segments 1-5, the dorsal tubercles are in trapezoidal or oblong position, i right in front, ii right at the back, of the segment, the latter not further from the central line than the former; the 1st to 5th abdominal segments are lengthened, as is usually the case in looping larvæ.

The special tubercles are tall, cone-shaped, fleshy-looking processes, bearing a stout conical spike or spine with a spreading base. The sides of the fleshy cone are covered with horny-looking hooks, which are probably a development of the horny studs with which the skin is sprinkled.

Generally speaking, the larva of *P. smaragdaria* has specially developed processes or tubercles on either side of the 1st, 2nd, 3rd, 4th, 5th and 8th abdominal segments. The spiracles are not similarly placed on all the segments, that on the 1st abdominal being about midway between the ventral and dorsal areas, those on the 2, 3 and 4 segments being higher up on the subdorsal area, that on the 5th is lower, though still higher than that on the 1st, that of the 6th is central, and on the 7th and 8th segments the spiracles are again higher. The skin of the larva is exceedingly rough and shagreened in appearance under the microscope, being seemingly studded with little horny plates.

There can be no doubt but that the special tubercles or processes, are intimately connected with the coat. The segments which bear the tufts of fragments, are always those which have the special tubercles, and when the coat has not been removed the special tubercles are never visible, although the spiracles are frequently so. I have drawn a larva at the hybernating stage, with and without the coat. A merely superficial glance will convince anybody that the fragments are, as Mr. Bacot points out, connected with the special tubercles. The only places where this will not hold good are on the metathorax, the bottom of the 6th and 7th abdominal segments, and the upper extremity of the 10th. Here I have fancied that there is also a special formation, differing in design from Mr. Bacot's special tubercle, but evidently serving the same purpose (figs. 4*b*, 5*b*). The rough fragments of silk are to be clearly seen entangled in the hooks of the special tubercles, after the coat is removed.

Pupa.—(Described from an empty shell.) Surface dead, rugose, shagreened or spiny, the dorsal area of the hinder abdominal segments being covered with flattened spines pointing towards the anus. On the dorsal area of the anterior abdominal segments, the surface is shagreened, while on the head, prothorax, wing-cases, &c., the surface is rugose to a greater or less extent. The spiracles are very large and prominent—immediately in front of the spiracles on the 2nd, 3rd and 4th abdominal segments are the scars of a large larval tubercle giving rise to a large flattened and twisted hair, more developed in the specimen under examination on the 2nd and 4th abdominal segments. Probably these are the scars or rudiments of the specialised larval tubercles connected with the coat. Dorsal tubercles i and ii are present on 1st to 4th abdominal segments, i bearing a fairly long hair. Of the wings a small corner of the secondaries shows, near the junction of the primaries with the mesothorax, and a narrow slip also shows, on the 3rd and 4th abdominal segments, extending just beyond the primaries. The dorsal area of the anal segment is prolonged beyond the anus, and flattened (not unlike the pupa of *Papilio machaon*) and bears a small group of longish spines ending in spirally curved hooks. These have a quantity of silk entangled in them. The pupa is pale grey in tint, mottled, lined and dotted with dark umber-brown. The spiracles and dorsal tubercles show up as black spots. A diffused double mediodorsal band is present on the anterior abdominal segments, and the wing nervures are strongly outlined in dark umber, almost black. The wing-cases extend to the end of the 4th abdominal segment, the tips of the third pair of legs to the end of the fifth; the abdominal segments 5-6 are telescoped to such an extent that the spiracles thereupon are hardly visible.

In dehiscence the mesothorax splits along the central (median) suture. The prothorax or dorsal head-piece does the same, and also divides from the mesothorax and ventral head-pieces. The ventral head- or face-pieces, eyes, legs and antenna-cases, form a single shield.

Description of Plate VII.

Fig. I. The egg: *a*. Side view. *b*. Edge. *c*. Apex. *d*. Markings more highly magnified.

Fig. II. The larva: First skin unclothed.

Fig. III. Larval hairs: *a*. The 1st abdominal segment. *b*. Part of the same more highly magnified, showing the "turf cutter and trumpet hairs." *c*. A hair from front of prothorax. *d*. A trumpet hair.

Fig. IV. Larva just before hybernation unclothed. *a*. The special tubercle. *b*. Discs and long hairs on lower part of some segments.

Fig. V. Larva same stage—clothed. *a*. The special tubercle enlarged. *b*. Discs and hairs enlarged.

The food-plants of Phorodesma smaragdaria, Fab.

By Rev. C. R. N. Burrows.

Since completing my paper on this species, I have been trying experiments with a view to clearing up in some measure the contradictions between the observations of English and continental entomologists as to the food-plants. My remarks apply, of course, to the larvæ in a state of confinement.

On May 8th I isolated eight larvæ, giving them *Artemisia vulgaris* and *Achillea millefolium* only. The latter plant it will be remembered is that given by Herr V. Muhlig and G. Koch, as the food of the Frankfort-on-the-Main larvæ. On May 10th *Artemisia vulgaris* was removed,

having been *slightly nibbled*. On May 18th the *Achillea millefolium* had been *slightly nibbled*, and two larvæ were dead. I then introduced *Achillea ptarmica*, *Matricaria inodorum*, *Pyrethrum aureum*, and a further supply of *Achillea millefolium*. On May 20th the remaining six larvæ had slightly nibbled the two latter plants, the others were untouched. So far there had been no attempt to repair the clothing, the larvæ were visibly shrinking and obviously starving to death. I then introduced *Tanacetum vulgare* (tansy), *Anthemis tinctoria* (garden form) and the double *Pyrethrum* of the garden. This time there was no mistake about the taste of the larvæ, they fairly fell upon the tansy, and stripped it, besides using it to repair their worn-out garments. I could again find but little or no trace of the *A. millefolium* being more than slightly nibbled. There is a difficulty of course in making sure that the finely cut leaves of most of these plants are or are not eaten, and also whether eaten or used for clothes, but I feel certain that, at any rate, as food for larvæ which had been fed up on one of our well known food-plants, of all the leaves tried, the *Tanacetum* alone would take their place.

While experimenting, I was surprised to find three small larvæ of *P. smaragdaria*, of about the hybernating stage, that is of course, very much smaller than they ought to be, feeding wild upon plants of French lavender. The true name of this plant, which is not a lavender, but belongs to the *Compositæ*, is *Santolina chamocyparissus*. It appears to me to be closely allied to the tansy, and since these larvæ had chosen it of their own accord, one must conclude that it is not altogether distasteful to them, considering that they might, had they wished, have moved on to southernwood, *Artemisia maritima* or *A. absinthium*, all of which are growing close by.

A few notes on Myrmecophilous Coleoptera.

(With a table of all the British species recorded with ants, according to Father Wasmann's method as applied to the Myrmecophilous Coleoptera of Hollandish Limburg.*)

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

I take the opportunity, whilst bringing out this table, to write a few notes on some of our species, and as, at the same time, the translation of Father Wasmann's valuable paper on the "Guests of Ants and Termites" is being published, I hope they may help to stimulate British coleopterists to work at ants' nests a little more. I should be very glad if coleopterists would send me local lists of the ants' nest beetles that occur in their districts, giving the time of the year of capture, and any remarks they may have made on their habits, &c. More evidence is wanted on the species that possess two hosts, living with them as true guests. Records of the capture of *Myrmedonia humeralis*, *Quedius brevis* and *Atemeles emarginatus* with the ant, and the month when found, would be useful. Of the first of these species Fowler writes (*Col. Brit. Isles*, ii., p. 57), "In nests of *Formica rufa*, and has been recorded from nests of *F. fuliginosa*, but the latter habitat appears doubtful." It is now, however, known to occur freely with both ants. Wasmann says it lives with the former only in the winter till about February, but with the latter from then till the end of the year. This is so as far as my experience goes. *Quedius brevis* is found

* *Tijdschr. v. Entom.*, xxx., s. 181, and xxxi., s. 242.

with the same two species of ants. Wasmann records it with *F. rufa* from January to December, but with *Lasius fuliginosus* from April to October or December. I have taken it with *F. rufa* in January, May and June, and with *L. fuliginosus* in April and May. *Atemeles emarginatus* has been recorded with *Myrmica scabrinodis, lævinodis* and *ruginodis: Formica fusca* and *F. rufa* with us. According to Wasmann it goes in February from *Myrmica* to *Formica*, where the larvæ are bred, and in summer or autumn the newly-hatched beetles go from *Formica* to *Myrmica*, where they pass the winter. *Staphylinus stercorarius* is recorded by Mr. Walker as occurring with *Myrmica ruginodis* at Rannoch (*Ent. Mo. Mag.*, February, 1900). Fowler mentions "a fine series taken by Mr. Bold in nest of a *Myrmica*" (*Col. Brit. Isles*, ii., p. 251) and I have twice taken it with *Lasius flavus*. I am of opinion that it should be considered to be a Myrmecophilous insect, and it is just a question whether it should not be placed in Class III of the table, instead of Class IV, where I have put it. Of course it is difficult to lay down a hard and fast rule, and several species might be placed in either of two classes.

Medon bicolor, Ol.—Of this insect, Fowler says (*l.c.*, p. 318) "We also appear to possess as British the closely allied species *M. bicolor*, Ol. The differences, however, between this and the preceding (*M. melanocephalus*, F.) are so slight that it would hardly seem to be more than a variety; it is proportionally broader and a little more thickly punctured, and the head is a little less parallel: these differences, however, are extremely slight: the elytra are very slightly longer, and the head and thorax are evidently more thickly punctured at the sides. This species or variety appears to be rather uncommon on the continent; it occurs under stones and moss in company with ants; there are specimens in Dr. Power's collection, from the London district which seem to agree with descriptions of this insect, and it may be somewhat widely distributed in the midland and southern districts." I have examined the specimens in the Power collection, which certainly bear out what Canon Fowler says. I have a specimen which I took in a nest of *Lasius flavus* at Eastbourne, which thoroughly agrees with them. It will be seen in the table that Dale records it with *Lasius flavus* and *Myrmica ruginodis*.

Claviger testaceus, Preyss.—I took several specimens of this beetle in a nest of *Lasius alienus* at Blackgang, Isle of Wight. This is the first record here of it occurring with this ant.

On reading the description of how *Cossyphodes bowrickii* behaved when mixed up with a number of the ants with which it occurs (see *The Guests of Ants and Termites*, *ante.*, p. 89), I was struck with what I had observed of the habits of the "ladybird," *Coccinella distincta*, which occurs with *Formica rufa*. At Weybridge, where the beetle is fairly common, when it was walking about among too many of the ants on the hillocks, it would now and again duck down flat as described of *Cossyphodes*. I introduced into the nests some of the common *Coccinella 7-punctata* from which *C. distincta* differs very slightly. The ants which had paid no attention to *C. distincta* endeavoured to attack *C. 7-punctata*. The latter ducked down also, and as the legs and antennæ in the *Coccinellidæ* can be packed close to the body, the ants had nothing to lay hold of, their jaws slipping off the smooth surface of the elytra. When unmolested again the beetle walked on a little, and eventually got away. I am now sure

that *Coccinella distincta* belongs to the protected group of Myrmecophilous Coleoptera. Its larva no doubt feeds on the *Aphidae* and *Coccidae* that occur in the nests of *Formica rufa*.

Clythra 4-punctata.—I am inclined to think that this beetle is a mimic of *Coccinella distincta*, as it has a strong superficial resemblance to a "lady-bird," and the *Coccinellidae* are known to be distasteful to insectivora. Its habitat is the same as that of the ladybird, in the nests of *Formica rufa*. Its larva is a soft fleshy grub, and to protect itself from the ants, it constructs a peculiar case. This case which is made of black excrementitious matter, is somewhat pear-shaped, and is open at the narrow end, this opening being closed by the hard horny head of the larva. On its upper side several ridges run from the mouth of the case, the inner ones meeting and forming a series of V's, as it is supposed to strengthen the case. When ready to change to a pupa the larva closes up the entrance to the case and fastens it to a stick or other object in the nest, it then turns round and faces the bottom of the case, through which the perfect insect breaks its way. I have taken this case in *F. rufa* nests at Buddon Wood, Oxshott, Weybridge and the Blean Woods, and have bred the beetle freely. It has been said that these larvæ feed on the eggs of the ants, but Wasmann is rather of opinion that they feed on the vegetable refuse of the nest, which seems more natural for a phytophagous beetle larva. The larval case of an allied species, *C. laeviuscula*, is described and figured by Wasmann in his "Zur Kentniss der Bosnischen Myrmekophilen" (*Wiss. Mitt. a. Bos. u. Her.*, Band vi., 1899) and as it is found in the bare earth in galleries of *Lasius niger* var. *alieno-niger* and *L. alienus*, it is difficult to know what the larva can feed on.

I now give a table classifying all our species, with the ants with which they have occurred, according to Father Wasmann's method. He divides them into four classes as follows:

Class I. Consists of the regular guests of the ant.
Class II. Consists of the regular guests of another species of ant.
Class III. Consists of chance guests which are often found in numbers with the ant.
Class IV. Consists of chance guests not often found with ants.

It will be seen by examining the table that we possess in Britain 44 true coleopterous guests; and that *Formica rufa* and *Lasius fuliginosus* are by far the most prolific in guests, the former possessing 22 true guests, and the latter 18.

I give the authority and reference to all the species, excepting those in Class I.

TABLE.

With Formica rufa. L.	Ptenidium formicetorum. Kr.
Class I.—Oxypoda formicetieola, Märk.	Coccinella distincta. Fald.
Oxypoda haemorrhoa, Mann	Dendrophilus pygmaeus, L.
Thiasophila angulata, Er.	Myrmetes piceus, Payk.
Dinarda märkeli, Mann	Monotoma conicicollis, Aubé
Myrmedonia humeralis, Grav.	Monotoma formicetorum, Thoms.
Nototheeta flavipes, Grav.	Cetonia floricola. Hbst., larvæ and pupæ.
Nototheeta anceps, Er.	Clythra 4-punctata. L., larvæ and pupæ.
Homalota parallela, Mann (talpa. Heer)	Labidostomis tridentata. L., larvæ and pupæ (?)
Quedius brevis. Er.	Class II.—Dinarda dentata, Grav. (Fowler, *Col. Brit. Isles*, ii., 53.)
Xantholinus atratus, Heer	Lomechusa strumosa, F. (Janson,
Leptacinus formicetorum, Märk.	
Ptilium myrmecophilum, All.	
Ptenidium kraatzii, Math.	

Ent. Ann., 1857. p. 95.) Doubtfully British.

Atemeles emarginatus. Payk. (Smith, *F. Trans. Ent. Soc. Lond.*, (1). iii., 1842, p. 151. Donisthorpe, *Ent. Mo. Mag.*, April, 1895.)

Batrissus venustus, Reich. (Fowler, *Col. Brit. Isles*, iii., 93.)

Dendrophilus punctatus, Hbst. (Janson, *Ent. Ann.*, 1857, p. 95. Donisthorpe, *Ent. Mo. Mag.*, February, 1896.)

Class III.—Homalota analis, Grav. (Donisthorpe. *Ent. Mo. Mag.*, March, 1896.)

Heterothops quadripunctula, Gyll. (Harwood, *Ent. Mo. Mag.*, March, 1899. Donisthorpe, *Ent. Recd.*, October, 1897.)

Xantholinus linearis, Ol. (Donisthorpe, *Ent. Mo. Mag.*, 1896, March.)

Astilbus canaliculatus. F. (*Scot. Nat.*, i., 1871, p. 258, White.)

Xantholinus ochraceus, Gyll. (Scott. *Zoologist*, xviii., 1860, p. 7026.)

Othius myrmecophilus, Kies. (Donisthorpe, *Ent. Mo. Mag.*, 1895, April.)

Exomias brunnipes, Ol. (Donisthorpe, *Ent. Mo. Mag.*, 1896, March.)

Class IV.—Aleochara ruficornis, Grav. (Janson, *Ent. Ann.*, 1858, p. 81.)

Oxypoda recondita, Kr. (Fowler, *Col. Brit. Isles*, vol. ii., p. 35.)

Myrmedonia haworthi, Steph. (Janson, *Ent. Ann.*, 1857. p. 95.)

Staphylinus latebricola. Grav. (Fowler, vol. ii., p. 252.)

Neuraphes longicollis, Mots. (Dale, *Entom.*, vol. xxviii., 1895.)

Scydmaenus godarti, Latr. (Fowler, *Col. Brit. Isles*. vol. iv., p. 77.)

Scydmaenus pusillus, Muls. (Fowler, *Col. Brit. Isles*, vol. iii., p. 78.)

Euthea plicata, Gyll. (Fowler. *Col. Brit. Isles*, vol. iii., p. 84.)

Cephennium thoracicum, Müll. (Donisthorpe, Weybridge.)

Euplectus signatus, Reich. (Dale, *Entom.*, xxviii., 1895.)

Eupleetus piceus. Motos. (Fowler, *Col. Brit. Isles*, vol. iii., p. 106.)

Hister marginatus, Er. (Harwood, *Ent. Mo. Mag.*, 1899, March.)

Corticaria serrata, Payk. (Fowler. *Col. Brit. Isles*, vol. iii., p. 290.)

Prionocyphon serricornis, Müll. (Fowler. *Col. Brit. Isles*, vol. iv., p. 124.)

With Formica sanguinea, Latr.

Class I.—Dinarda dentata, Grav.
Hetaerius ferrugineus, Prys.

Class II.—Dinarda märkeli, Mann (Dale, *Entom.*, xxviii., 1895.)

With Formica fusca, L.

Class I.—Ptenidium kraatzii, Math.
Hetaerius ferrugineus, Prys.

Class II.—Homoeusa acuminata, Möts. (Janson, *Ent. Ann.*, 1857, p. 95.)

Dinarda dentata, Grav. (Fowler, *Col. Brit. Isles*, vol. ii., p. 53.)

Atemeles emarginatus, Pk. (Janson, *Ent. Ann.*, 1857, p. 96. Smith, *Trans. Ent. Soc. Lond.*, iii., 1842, p. 151.)

Atemeles paradoxus, Grav. (Fowler, *Col. Brit. Isles*, vol. ii., p. 54. Janson, *Ent. Ann.*, 1857, p. 96.)

Claviger testaceus. Preys. (Janson, *Ent. Ann.*, 1857, p. 95.)

Class III.—Myrmedonia limbata, Payk. (Janson, *Ent. Ann.*, 1858, p. 80. Dale, *Entom.*, xxviii., 1895.)

Class IV.—Aleochara ruficornis, Grav. (Janson, *Ent. Ann.*, 1857. p. 95.)

Euryusa laticollis. Heer (Fowler, vol. ii., p. 164.)

Cephennium thoracicum. Möts. (Donisthorpe. Weybridge.)

With Lasius fuliginosus, Latr.

Class I.—Homoeusa acuminata, Möts.
Microglossa pulla, Gyll.
Microglossa gentilis, Märk.
Oxypoda vittata, Märk.
Thiasophila inquilina, Märk.
Ilyobates glabriventris. Rye
Myrmedonia funesta, Grav.
Myrmedonia humeralis, Grav.
Myrmedonia cognata, Märk.
Myrmedonia lugens, Grav.
Myrmedonia laticollis, Märk.
Nototheeta confusa, Märk.
Quedius brevis, Er.
Xantholinus glaber, Nord.
Batrisus venustus, Reich.
Ptenidium formicetorum. Kr.
Dendrophilus punctatus, Hbst.
Amphotis marginata, Er.

Class III.—Homalota nitidula, Kr. (Fowler, *Col. Brit. Isles*, vol. ii., p. 80.)

Homalota oblongiuscula, Sharp (Fowler, *Col. Brit. Isles*, vol. ii., p. 80.)

Homalota exarata, Sharp (Fowler, *Col. Brit. Isles*. vol. ii., p. 104.)

Homalota vicina, Steph. (Donisthorpe, Oxshott.)

Oligota pusillima, Grav. (Fowler, *Col. Brit. Isles*, vol. ii., p. 174.)
Oligota atomaria, Er. (Fowler, *Col. Brit. Isles*, vol. ii., p. 174.)
Heterothops 4-punctula, Gyll. (Fowler, *Col. Brit. Isles*, vol. ii., p. 225.)
Quedius mesomelinus, Marsh. (Donisthorpe, *Ent. Record*, 1899, October.)
Xantholinus linearis, Ol. (Donisthorpe, Oxshott and Walton.)
Othius myrmecophilus, Kies. (Fowler, vol. ii., p. 296. Donisthorpe, *Ent. Mo. Mag.*, February, 1896.)
Ptenidium turgidum, Thoms. (Dale, *Entom.*, xxviii., 1895.)
Ptenidium gressneri, Er. (Fowler, *Col. Brit. Isles*, vol. iii., p. 141.)
Melanophthalma fuscula, Humm. (Donisthorpe, Oxshott.)

Class IV.—Oxypoda longipes, Muls. (Dale, *Entom.*, xxviii., 1895.)
Myrmedonia haworthi, Step. (Fowler, *Col. Brit. Isles*, vol. ii., p. 55.)
Myrmedonia limbata, Payk. (Fowler, *Col. Brit. Isles*, vol. ii., p. 56.)
Oxypoda laticollis, Heer (Fowler, *Col. Brit. Isles*, vol. ii., p. 164.)
Leptinus testaceus, Müll. (Fowler, *Col. Brit. Isles*, vol. iii., p. 9.)
Scydmaenus pusillus, Müls. (Donisthorpe, *Ent. Mo. Mag.*, February, 1896.)
Cephennium thoracicum, Müll. (Donisthorpe, Oxshott.)
Ptenidium emarginatus, Er. (Hereford, *Ent. Mo. Mag.*, March, 1899.)
Abracus globosus, Hoff. (Fowler, *Col. Brit. Isles*, vol. iii., p. 214.)
Corticaria serrata, Payk. (Fowler, *Col. Brit. Isles*, vol. iii., p. 290.)
Cercyon 5-punctatum, Woll. (Fowler, *Col. Brit. Isles*, vol. iii., p. 329.)

With Lasius flavus, De G.
Class I.—Claviger testaceus, Preys.
Trichonyx sulcicollis, Reich.
Hetaerius ferrugineus, Preys.
Class II.—Oxypoda haemorrhoa, Mann (Dale, *Entom.*, xxviii., 1895.)
Homoeusa acuminata, Möts. (Donisthorpe, Mickleham.) (In nest mixed with *L. niger*.)
Class III.—Astilbus canaliculatus, F. (*Ent. Ann.*, 1857, p. 95, Janson.)
Class IV.—Clivina fossor, L. (Crowther, *Ent. Mo. Mag.*, xv., 1879, p. 19.)

Myrmedonia limbata, Payk. (Janson, *Ent. Ann.*, 1857, p. 95.)
Staphylinus stercorarius, Ol. (*Col. Brit. Isles*, vol. ii., p. 251. Donisthorpe, *Ent. Mo. Mag.*, 1896, February, and 1895, April.)
Othius myrmecophilus, Kies. (Donisthorpe, *Ent. Mo. Mag.*, 1896, February.)
Medon bicolor, Ol. (Dale, *Entom.*, xxviii., 1895. Donisthorpe, Eastbourne.)
Bythinus glabratus, Rye (Fowler, *Col. Brit. Isles*, iii., p. 89.)

With Lasius niger, L.
Class I.—Claviger testaceus, Preys.
Class III.—Astilbus canaliculatus, F. (Donisthorpe, *Ent. Mo. Mag.*, 1896, March.)

With Lasius brunneus, Latr.
Class I.—Batrisus venustus, Reich.

With Lasius alienus, Först.
Class I.—Claviger testaceus, Preys. (Donisthorpe, Blackgang, Isle of Wight.)

With Myrmica scabrinodis, Nyl.
Class I.—Atemeles emarginatus, Payk.
Class III.—Astilbus canaliculatus, F. (Donisthorpe, Guestling.)
Class IV.—Myrmedonia limbata, Payk. (Donisthorpe, Mickleham.)

With Myrmica lalvinodis, Nyl.
Class I.—Atemeles paradoxus, Grav.
Atemeles emarginatus, Payk.

With Myrmica ruginodis, Nyl.
Class I.—Atemeles emarginatus, Pk.
Class IV.—Myrmedonia collaris, Pk. (Dale, *Entom.*, xxviii., 1895.)
Staphylinus stercorarius, Ol. (Walker, *Ent. Mo. Mag.*, February, 1900.)
Medon bicolor, Ol. (Dale, *Entom.*, xxviii., 1895.)
Bryaxis haematica, Reich. (Dale, *Entom.*, xxviii., 1895.)

With Tapinoma erratica, Latr.
Class I.—Myrmedonia plicata, Er.

With Tetramorium caespitum, L.
Class II.—Trichonyx märkeli, Aubé (Dale, *Entom.*, xxviii., 1895.)
Class IV.—Bythinus glabratus, Rye (Dale, *Entom.*, xxviii., 1895.)

With Leptothorax acervorum, F.
Class III.—Astilbus canaliculatus, F. (Donisthorpe, Fairlight.)

The Relationship between the Larval and Imaginal Legs of Lepidoptera* (*with Plate*).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

(*Concluded from* p. 145.)

Before further discussing the general question, we may look at some more of the specimens. We may take that represented in plate vi., fig. 2 next. Here the amputated larval limb is replaced by an amorphous nodule of considerable size. The basal structures seem to be fairly intact, and on Gonin's theory ought to have supplied us with a leg, but the imago has no leg at all beyond the trochanter and a round nodule, which we may call the femur. I do not know at what date this specimen was operated on, but I believe immediately on entering the last moult. I always operated immediately after a moult so as to give plenty of time for healing to take place before the next moult. In all my specimens the trochanter is present in fairly normal condition, showing that in amputating the leg I interfered with the femur and all beyond, but not with the trochanter and coxa, which are not represented in the larval leg.

In plate vi., fig. 3, the larval parts show that the right leg has been interfered with as well as the left. It is regenerated to much the same stage as the left leg was in fig 1, and the imaginal leg is correspondingly well developed, though very probably smaller than the original leg would have been; but on the left side we have a stump that results from injury during the last larval stage, there are some remains of the first larval joint, crushed and twisted, and attached to it a black mass of dried crust, such as resulted from the immediate closing and scabbing of the wound. No regeneration could take place during larval life, and what did take place at the pupal moult appears to have occurred, not from the base of the leg, but from the crushed remains of the first larval joint. We have in consequence a very small representative of the imaginal leg, a complete trochanter, a femur half the length of that of the other side, a tibia to a still smaller scale, but still showing the tibial spurs, the tarsus cannot be said to have more than one joint, but that carries the claws, very small but fairly well developed. In this specimen the whole larval injury is concentrated on the first joint, the base being uninjured, therefore if the imaginal leg originated in this base, independently of the larval leg, we ought to have had a limb perfect as to its femur and tibia at any rate, even if we choose to accept the view of Gonin that the larval leg represents the tarsus.

In plate vi., fig. 4, we have an instance in which I failed to demonstrate the condition of the larval leg, it was, at any rate, much damaged and difficult to recognise, but some minute trace of a cicatrix of larval leg probably existed. In the imago we have an example, the only one that seems tolerably free from doubt, of a modified trochanter. The femur and tibia are represented by very amorphous pieces, not united in a normal manner, the tibia, however, showing spurs, whilst the tarsus is in one piece, with indications of possible division into two or three joints and of the terminal hooks. The whole appendage, however, is very small and crippled, clearly a very abortive attempt at regeneration, and in no wise a normal, or any way near a normal, attempt to produce a limb from the usual centre for its development.

* Read before the South London Entomological and Natural History Society.

That represented in plate vi., fig. 5, is a very similar specimen, but here the base of the larval leg is clearly seen to be uninjured, whilst no trace of the leg itself can be confidently recognised. In the imago the leg parts are complete, though they are very much smaller than on the opposite side, the terminal tarsal joints being very small and only one claw being clearly visible.

I take it that in fig. 4 the amputation of the larval leg was made so high up as to injure without destroying the regenerative centre, whilst in fig. 5 this centre remained intact, and we see in the imago how much it was possible for it to accomplish in the one moult from larva to pupa. I imagine that the moult from pupa to imago does very little to the further development, the pupa being in reality rather an immature imago than a previous stage in the definite sense in which the larva is so, and, therefore, the development of a regenerated part may take place at the pupal moult, but not at the imaginal.

No. 9 (an example not figured) is of some interest, as in this case the amount of larval regeneration that has taken place is much less than in pl. iv., fig. 1, yet the imaginal parts are not much less fully developed than in that specimen. The larval leg is represented by basal parts perfect, femur (first joint) well represented, but further joints are represented only by some wrinkled chitin at its extremity. This is not, however, mere crust or scab, but is obviously tissue, formed at a moult that has occurred since the injury, and no doubt, therefore, does really represent the further joints, and may, when the larva was alive, have been more distended, and really showed the several parts, but being soft has collapsed at moult, and not unravelled itself in my manipulations.

In plate vi., fig. 6, amputation preceded the last larval moult, the leg base is normal, and the leg itself represented by a small capsule that has the base of a larval femur very recognisable as its only very definite feature. On Gonin's view we ought here to have a well-developed leg. We have, however, a very small and somewhat anomalous structure. The trochanter, as usual, is normal, and the tarsus is complete though very small; but the femur and tibia are represented by one curved piece, basally, no doubt, femur, apically tibia, both because it possesses a tibial spur and because it articulates with the tarsus. The specimen of the larval skin has the leg-piece folded under, and so it is not obvious at once as in some of the other specimens that have been more successfully displayed.

These specimens demonstrate that on a larval leg being amputated there arises from the structures at its base a new larval leg. At first of very small size, and with the several parts represented by very small chitinous scraps, but still often perfectly recognisable as the several parts of a complete leg. If this process began early enough in larval life, no doubt by the last larval instar a fully formed larval leg would be reproduced, practically identical with that of the other side. This I have still, however, to prove experimentally, but what we find proved is, that if by the last larval instar a leg has been reproduced with all its parts, no matter how small they may be, then the imago possesses a perfect limb, though smaller in size than its neighbour.

If the larval leg at the last instar is imperfect as to parts, then the regenerated leg will be extremely small, the parts being as it were

outlined but not fully grown, just as the larval leg is at its first appearance when reproduced after amputation. There is another alternative, and that is that the imaginal leg may be wanting beyond the trochanter. My experiments are too few to determine which distinguishes these cases.

If the parts are entirely wanting in the imago, it is clear that the larval parts that correspond to the imaginal part, whether as partially formed or merely germinal material, must have been removed. And, further, that the mere basal germinal material that gives rise to the regeneration of the limb, has either been removed, or, more likely, has not been afforded its proper stimulus. In the other case, if the imaginal limb is present, but of reduced size, it is clear that the proper larval source of the imaginal limb has been removed, and that it has been re-supplied by regeneration.

If certain portions are of full size, either the larval parts to which they correspond have not been removed, or they have been removed so early in larval life that regeneration has had time to become complete.

It may be said that if regeneration can re-form the whole limb from germinal material at the base of the limb, then it is obvious that Gonin's hypothesis of germinal material existing there is admitted. But this is not so. Gonin's hypothesis is that the germinal material for the leg exists there, and that it is employed to form the imaginal limb in ordinary. Whereas the true hypothesis is that this regeneration plasm is not used in any way, and does not develop into anything, unless required for its proper function of supplying an amputated limb. This becomes evident if we consider the case of a lobster or a cockroach, where regeneration takes place when a limb is lost, but where there can be no doubt the limb is not grown from the base *de novo* at each moult, in ordinary circumstances.

I think we may reasonably conclude from the facts observed: (1) That the old idea, that the larval leg *is* the imaginal leg, is substantially correct, and that the result of the comparison with trichopterous and other larvæ, showing that the parts present in lepidopterous larvæ are the femur, tibia, and tarsus, is supported by them. (2) That there is germinal material at the base of the larval leg, which would under ordinary circumstances be functionless, but on the loss of the leg by accident or injury, comes into action and reproduces the lost limb, larval or imaginal, as the case may be, but the reproduced limb is a diminutive sketch of the lost limb, and can only reach a size to be functional after further moults. (3) That the progress made in the regeneration of the lost part is disclosed at each moult, remaining as it were suspended in the intervals; but there is little doubt that its real progress takes place during these apparently quiescent intervals.

It will, I think, be safe to conclude that M. Gonin's hypothesis is quite erroneous.

Explanation of Plate VI.

The Plate represents the third pair of legs of certain imagines of *Porthetria dispar*, accompanied by the same legs of the larval skin cast at the pupal moult, the left leg having been removed during the last larval or some preceding instar. In fig. 3 the right larval leg has also been removed. Further details in text.

The Synonymy of some of the Emerald Moths.

By LOUIS B. PROUT, F.E.S.

Although, fortunately, the specific names of several of our Emerald moths are established beyond the possibility of cavil, there are others which have already suffered untold tortures at the hands of synonymists, who, however, have not yet succeeded in placing them in a really satisfactory state. As I have now at hand the whole of the material necessary for a revision of them, I venture to submit, as briefly as possible, the results of my investigations, worked out on the basis of the "Merton Rules" of nomenclature.

1. *Metrocampa margaritata*, Linn.—Though not related to the true Emerald family, the popular name of this species justifies my mentioning it under this heading. Many writers have tried to unite the *margaritaria* of the *Fauna Suecica* (1761), with the *margaritata* of the *Systema Naturae*, Edit. xii. (1767), and this union has been sanctioned by Werneburg and Staudinger; but it is quite inexcusable, as Speyer pointed out in the *Stett. Ent. Zeit.*, 1888, p. 209. The former (*margaritaria*) had a yellow Roman B in the middle of the superiors, and Speyer shrewdly suspected that "Hab. Holmiæ Cl." was a mistake, and that it was an exotic; but being apparently unacquainted with Clerck's *Icones*, he was unable to follow up the question further. In 1764, Clerck (pl. 51-2) figures his *margaritaria*, a species which is identified by Aurivillius (*Recens. Mus. Ludov. Ulr.*, p. 180), as probably = *Glyphodes crameralis*, Gn., and is called *Morocosma margaritaria* by Lederer (*Wien. Ent. Monats.*, vii., p. 404) and Aurivillius; Clerck or Linné evidently made some mistake as to the source whence it was obtained, as the species really comes from Amboina.

As the name *margaritata* is not *identical* with *margaritaria*, and the latter is not a true Geometer but a Pyralid, there is no adequate reason for abandoning the former appellation for our *Metrocampa*, but its origin is to be dated from 1767, when it was erected as a new species, and not as having any connection with *margaritaria*, Linn., "Fauna Suecica," Cl., "Icones."

I may remark here that I have, after mature consideration, decided against applying the Merton Rule (or rather, *Recommendation*), No. 23, retrospectively; the rule in question expressly stipulates that "in the future" generic names homonymous in derivation, but differing in suffix, should be avoided, and I therefore construe the recommendation concerning species in the same light—"In the case of species, words identical in meaning but differing slightly in form should in the future.—L.B.P. be avoided. I do not, therefore, regard *Phalaena Geometra prunata*, Linn., as invalidated by *P. G. prunaria*, and so on in many other cases.

2. *Geometra* (*Iodis*) *vernaria* (Schiff.), "Schmett. Wien.," p. 97 (1775).—This name cannot possibly stand. Everyone knows that *vernaria*, Schiff. (the Clematis Emerald), rests on an erroneous determination of the *vernaria* of Linné, which the authors of the Vienna work definitely cite. Whether or not *vernaria*, Linn., was a synonym, as Staudinger asserts, does not affect the question, and his acceptance of *vernaria*, Schiff., is quite inconsistent with his rejection of *Geometra* (*Cidaria*) *transversata*, Thnb., *nec* Rott., and other similar instances. The following names have to be considered in connection with the

synonymy of the Clematis Emerald. The Linnean description reads as follows:

"*Ph. G. vernaria.* Pectinicornis, alis viridibus: strigis duabus albis repandis, antennis apice setaceis. Praecedenti [*lactearia*] simillima, sed alae pallide virescentes strigis duabus, albis, repandis: altera versús postica. Subtus tota pallidior. Accedit ad *Ph. viridatam.* Hab. in Dalekarlia. C. Blom." (Linn., *F. S.*, ed. ii., p. 323).

Volutata, Fb., "Syst. Ent.," p. 635 (1775).—Werneburg argues that this represents the species now under consideration, but Staudinger denies this with a "certo," and as the first author who dealt with the name, *i.e.*, Borkhausen, plausibly determined it for *viridata*, Linn., and his determination has never been proved erroneous, it seems to me inadmissible to take up the name *volutata* for our Clematis Emerald; yet Werneburg's view obtained a little support from a source which he was apparently not able to investigate, for Fabricius ("Spec. Ins.," ii., p. 262) cites, though with a ?, "Harris," tab. 8, fig. 8, *i.e.*, of Harris' "Exposition," where the Clematis species is represented. The Fabrician description reads as follows:

"*Ph. volutata.* Seticornis, alis omnibus viridibus, strigis duabus albis. Hab. in Germania. Corpus et alae viridia. Strigæ duæ lineares, anteriore obsoletiore: subtus striga unica obsoleta" (Fab., *Syst. Ent.*, p. 635).

Eruginaria, Bork., "Eur. Schmett.," v. 43 (1794).—This is quite certainly = *vernaria*, Auct. (*nec* Linn.), but it rests on a reference to *aeruginaria*, Schiff., which is just as certainly not this species; Schiffermüller was too good an entomologist to have named a non-variable species like this twice, and, moreover, he places his *aeruginaria* between *putataria* and *lactearia*, which would have led to the suspicion that it was a green *lactearia*, even if Treitschke had not later (on the evidence of the Vienna collection) stated this to be the case. **Eruginaria*, Bork., must, therefore, be set aside as invalid.

Chrysoprasaria, Esp., v., figs. 1-4 (1794).—Here at length we come upon an admissible and by no means inappropriate name which should henceforward be adopted for the species; it may or may not be prior to Borkhausen's *aeruginaria*, but the question is of no importance.

§ *Lucidata*, Don., iii., p. 67, pl. xcvii (1794).—This was erected in the same year as the preceding, but as it collides with *Phalaena lucidata*, Fb., "Spec. Ins.," ii., p. 259 (1781) it cannot be adopted, even if it can be shown to have priority.

3. *Geometra* (*Hemithea*) *strigata*, Müll.—I have a strong suspicion that this species is the true *vernaria* of Linné, but as his description is defective, and has led Werneburg and Staudinger to determine it for green *lactearia* (the earlier name having been founded on faded, colourless examples), I do not venture to restore it—especially as its application also to *chrysoprasaria*, Esp., tends to deepen the confusion. Linné's type specimen of *vernaria*, which bears the appearance of being authentic, is certainly a small *strigata*, Müll. The other names to be considered in connection with this species are:

Viridata, Linn., "Syst. Nat.," edit. x (1758).—Werneburg argues at great length that this is really = *strigata*, Müll., but his arguments are so weak that I will not even waste space in quoting them. Scopoli in 1763, Schiffermüller in 1775, and a host of others, rightly recognised Linné's species, and his type is still extant, confirming the identification. *Viridata*, Linn., *nec* Wrnbg., therefore, stands for the species so named by Tr., Gn., Stgr. et auct.

§ *Strigata*, Müll., "Faun. Frid.," p. 51 (1764).—Unfortunately this name is invalid, for Scopoli published another *strigata* among the Geometers the year previous (=*pusaria*, Linn.).

Vernaria, Fb., "Syst. Ent.," p. 620 (1775).—Apparently not personally known to Fabricius, but founded on Linné and on Roesel's figure. It agrees in the main with *strigata*, Müll., and perhaps strengthens the possibility at which I have already hinted in dealing with *vernaria*, L., but how little claim Fabricius has to be regarded as an authority on this particular name is shown by the fact that "*vernaria*, Linn.," in the Banks collection (probably named, or at least sanctioned by Fabricius) is a *Metrocampa margaritata*!

**Thymiaria* (Schiff.), "Schmett. Wien.," p. 97 (1775).—*Thymiaria*, Linn., cited by Schiffermüller, was founded on a mixture of *Thalera fimbrialis*, Scop., and *Hemithea strigata*, Müll., and even though Linné's types belong to the latter, the name was founded on the conception derived from Frisch's thyme species (=*fimbrialis*, Scop.), and a sufficient case can therefore be made out for the application of Merton Rule 24, "A name which involves a false proposition . . . may be changed."

Estiraria, Hb., "Btr.," i., pt. 4, p. 22, pl. iii. R. (1789).—This name is in every way unobjectionable, and was in general use on the continent until the modern era of priority-law. It should without doubt supersede *strigata*, Müll., unless the doubtful claims of *vernaria*, Linn., can be accepted.

4. *Geometra* (*Nemoria*) *viridata*, Linn.—I have already pointed out that the accepted synonymy of this species has been upset by Werneburg for nought: I may add that it is not clear why he renames it *prasinata*: even if his assumption that it was not the true *viridata* of Linné had been well-founded. I do not see anything against the employment of Hübner's name of *cloraria* (fig. 352).

I subjoin a summary of the synonymy as given in this article: the remainder of the specific names stand as in Staudinger's *Catalogue*.

1. *Metrocampa margaritata*, L., "S. N.," xii. (1767), *nec margaritaria*, L., "F. S." (1761), Cl. *Sesquistriataria*, Knoch (1781). (I have added the earliest available synonym in case the name *margaritata* should need to be rejected).

2. *Iodis* **vernaria* (Schiff.), "Schm. Wien." (1775), *nec* Linn. **Eruginaria*, Bkh. (1794), *nec* Schiff. *Chrysoprasaria*, Esp. (1794). § *Lucidata*, Don. (1794), *nec* Fb. **Volutata*, Wernbg. (1864), *nec* Fb.

3. *Hemithea ? vernaria*, Linn. (1761), nom. dub.; § *Strigata*, Müll. (1764), *nec* Scop. **Thymiaria* (Schiff.), "Schm. Wien." (1775), *nec* Linn. *Estiraria*, Hb. (1789).

4. *Nemoria viridata*, Linn. (1758). *Cloraria*, Hb. (?1804). *Prasinata*, Wernbg. (1864).

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

So far as one is able to get at the real facts (*i.e.*, apart from the opinions of observers) one is able to conclude that the movements of *Anosia archippus*, in North America, are very similar to those of *Pyrameis cardui* in Europe. Like the latter, it appears to have its own subtropical (and tropical) permanent home, and more or less each season, but more particularly in occasional seasons, to send out large numbers from these centres in northerly, easterly and westerly directions, reaching well up into Canada and the North-west Territory,

where it becomes exceedingly abundant in the autumn months. This irregularity in abundance is equally marked in both species, 1868, 1871, 1892, and 1899 were among the abundant years for *A. archippus*. Moffat says that near London, in Ontario, he has seen "specimens arrive in the spring in a sorely faded condition, indicating age and exposure to the weather, followed by others that were comparatively fresh as if they were younger and less travel-stained than the first. Then, again, the first arrivals are sometimes in fairly good condition, as if they had not been long upon the wing; whilst other specimens have been seen haunting a particular locality for weeks, and, as far as could be judged by their gradually fading colours, they were the same individuals." He has also "seen them flying plentifully for six or eight days and then begin to pair, indicating that these particular individuals had not laid eggs before reaching that locality;" further, he has "seen fresh-looking specimens flying at the time the new brood was emerging from the chrysalis, and so fresh as to give rise to a difference of opinion as to whether they were previous arrivals or bred on the spot." Lastly, he had "seen quite small caterpillars on the milkweeds when others had passed into the mature state," all of which has convinced him that there is "more than one wave of migration northward during the breeding season." All these irregularities of habit will be certain to strike one who has studied the subject, as being readily paralleled during a series of years by the immigrants of *Colias edusa* and *Pyrameis cardui*, and their progeny in our own country.

The species belongs essentially to the tropical and subtropical regions of the American continent. It is found all over the West Indies, as well as on the mainland, and extends south as far as Patagonia. During the winter no specimens are seen above 30° N. lat., in North America, and, at this latitude, but rarely; the only individuals that appear to get through the winter seem to be those that are well within the subtropical and tropical areas. The species is most probably continuously-brooded in the most favourable districts of its permanent winter home, and Edwards says that there are three or more broods in a season in Virginia; whilst in the more northerly part of its summer range—Hudson Bay district, and the basin of the Athabasca—one, and occasionally an attempt at a second, brood appears to be its maximum. Moffat states that it is quite clear that it cannot survive the winter in any stage of its existence in Ontario, or northward of it, and that each recurring winter sweeps the country clear of this particular species, and it has to be restocked every spring by immigrants from the south. Riley suspected that fertile females started northward in early spring, when the *Asclepias* was ready to receive their ova, and travelled some distance before they had finished ovipositing, when these would naturally perish; then he supposed their progeny continued to advance and carry on the work of producing ova to stock the milkweeds as they came north, so that there might be several broods required in a season to reach the northern limits of its food-plant. Scudder claims, on the other hand, that it is a long-lived insect, that a female starting northwards may travel for weeks, depositing her eggs as she goes, a few at a time, until she reaches the northern limit of the growth of the food-plant, and further asserts that the insect leaves its winter quarters later in the season than other butterflies, that it is "single-brooded," that it "continues upon the

wing until July and August, laying eggs all the time, so that the insect may be found in its earlier stages throughout most of the summer," and that "the perfect insect lives a full year, mingling on the wing with its own progeny, and witnessing the decay and renewed growth of the plant which nourished it." He also holds that no *A. archippus* born northward ever lays eggs the same season. All of which tends to show that whilst the fact that the species migrates is well known, no sufficiently accurate observations by trained naturalists are forthcoming to say actually what its mode of migration really is. Edwards' statement that there are several broods in West Virginia—eggs laid during April produced butterflies at the end of May, eggs laid on June 1st produced imagines by June 25th, eggs deposited by this brood produced butterflies towards the end of July, whilst eggs laid July 29th-30th, produced imagines which began to emerge on August 20th, and the final brood was from eggs laid August 30th, the butterflies commencing to appear on September 29th (*Canadian Entomologist*, xi., p. 289)—suggests continuous-broodedness of the most pronounced type. A note from Abbot's MSS. indicates pupa of *A. archippus* on April 25th, that emerged May 11th (*Canadian Entomologist*, iv., p. 74), so that there is probably a brood before the earliest one mentioned by Edwards, or the first brood is earlier in some years than in others. Lintner gives the species as triple-brooded in New York. It is unfortunate that Scudder, who has written so much about this species, is utterly at variance on this point with the observations of almost every other American entomologist. His account, published in *Psyche* for July, 1875, of the habits of this species, and just referred to, was so improbable, that one is hardly surprised at Edwards' careful working out of the real facts of its life-history (*Psyche*, December, 1878), in which he showed that the hybernating females came early from their winter quarters, began to lay eggs at once, and died directly after, and it is much to be regretted that Scudder repeated his statements as to its life-history and habits in his later work in 1881. As Edwards remarks (*Canadian Entomologist*, xiii., p. 214), if Scudder's life-history of the insect had been even approximately accurate, it would be a sort of Methusaleh among butterflies, and instead of designating this phenomenal butterfly "The Monarch," it would be the correct thing to dub it "The Patriarch."

However little definite information there is about the spring migration of *A. archippus*, a great number of observations have been recorded of a habit that is certainly unknown in any of our most observed Palæarctic migrating species. This is the habit of swarming in the autumn. In some seasons the species has, at this time of the year, been observed in vast flocks, moving from place to place, and on these movements a theory has been based that the species returns to its subtropical haunts to winter. Scudder writes of this return journey as if it were proved beyond question of dispute. Moffat says: "That it migrates southward in the autumn in immense bodies, sometimes numbering millions, is well known, and has been frequently observed; therefore, it must return in the spring, but by scattered individuals, to take up the territory it vacated in the fall," and again he writes: "A longer term of life in the mature state than is allotted to butterflies generally, to enable it to fulfil its seasonal functions, seems to be required, for, if the same individuals that leave the north about the end of August or

beginning of September, pass the winter in the south, and then return northward in the early spring to deposit their eggs for the summer's brood, it would give them a much longer active life in the mature state, than falls to the lot of butterflies that hybernate in this region. Whether any of those passing the winter in the south, reach the far north the following season, is yet open to question." Without discussing the doubtful logic of the first of these quotations, except to say that, even if we believed the species did actually reach the south, where it could hybernate, after leaving the northern regions where the autumnal examples were born, we do not understand why it must of necessity return "in spring, by scattered individuals," and we would ask whence, if not from those "passing the winter in the south," Moffat surmises those that "reach the far north the following season" do come. Possibly he believes that not the original emigrants themselves but their progeny reach so far north. The analogy of *Pyrameis cardui*, *Colias edusa*, *C. hyale*, and other migrating Palæarctic species, leads us to suspect that it is the emigrants that reach to the northern limit of the range of the species. It may be well now to consider in some detail the observations relating to the autumnal swarms of this insect that have given rise to the view that a return journey is accomplished.

Saunders reports (*Canadian Entomologist*, iii., pp. 156-157) that on September 1st, 1871, while driving along the Lake Shore Road, on the borders of Lake Erie, a mile or two south of Port Stanley, some groups of *A. archippus*, numbering probably hundreds of individuals, which had rested at night on the trees adjoining the hotel at Port Stanley, were gyrating in a wild manner at all heights, some so far up that they appeared but as moving specks in the sky, others floating lower, over the tops of the trees, in an apparently aimless manner. At about nine o'clock the same morning, however, passing a group of trees forming a rude semicircle at the edge of a wood facing the lake, the leaves of the trees attracted attention. They seemed possessed of unusual motion, and displayed fitful patches of brilliant red. On alighting, a nearer approach revealed the presence of vast numbers—I might safely say millions—of these butterflies clustering everywhere. When disturbed, they flew up in immense numbers, filling the air, and after floating about a short time gradually settled again. There appeared to be nothing on the trees to attract them. Reed observes (*loc. cit.*, i., p. 19) that in 1868 the species literally swarmed at Amherstburg, reminding him of a similar occurrence in Toronto about seven years previously. Peabody notes (*loc. cit.*, xii., pp. 119-120) that at Racine, Wisconsin, during the first week of September, 1868, *A. archippus* appeared in great numbers and gathered in several swarms about trees in the vicinity. The day was cloudy, but without rain. Shortly after noon the swarms seemed to gather and settle upon an oak tree in the garden, the southern aspect of which they covered to such an extent that the green of the leaves was quite obscured by the brown of the wings of the butterflies. They remained until after nightfall, but were gone in the morning. Another observer on September 19th, 1868, reports that at St. Joseph, Missouri, he saw "millions of these butterflies (*A. archippus*) filling the air to a height of three or four hundred feet for several hours, and flying from north to south." Thaxter writes (*loc. cit.*, xii., p. 38) that while spending the winter of 1875-1876 in Apalachicola, Florida, he found a swarm of

A. archippus in a pine grove not far from the town. The trees were literally festooned with butterflies within an area of about an acre, and were clustered so thickly that the trees seemed to be covered with dead leaves. Upon shaking some of the trees a cloud of butterflies flew off, and the flapping of their wings was distinctly audible. They hung in rows (often double) on the lower dead branches, and in bunches on the needles. Towards evening the flock received additions every moment, and, a net full being caught and liberated, all but three returned to the flock. During his visit two more flocks were observed not far from the first but neither was so large. He also observes that he had seen *A. archippus* flocking at the Isles of Shoals, New Hampshire, in very much the same manner, after having flown nine miles from the mainland." One remark made by Thaxter, *viz.*, that he "often observed examples of *A. archippus*, *in coitu*," is suggestive that the species would not hybernate, as there is as yet we believe, no record of a butterfly pairing in autumn and then living through the winter. It occasionally happens, however, among hybernating moths. Mundt reports (*loc. cit.*, xi., p. 239) that, on September 7th, 1879, at Fairburg, Illinois, while walking through a grove, he saw a large number of *A. archippus* hovering about and settling upon some limbs of a hickory, and on the next day, before sunset, he found the butterflies in still larger numbers on two branches of the tree. After dusk he visited the grove with a long step-ladder, box and lantern, and took 51 males and 74 females, all of them being perfect. He adds that "the weather had been pretty cold for several days, with slight frost at night." Moffat records (*loc. cit.*, xii., p. 37) them as "congregating in immense numbers, with their wings closed, and not noticeable unless disturbed, very few being on the wing. Their favourite resting-place seemed to be dead pine twigs, which would be drooping with their weight. In going to and from the woods I have seen several of them at once coming from different directions, high in the air, sailing along in their own easy and graceful way, all converging to the one spot. There were thousands, perhaps hundreds of thousands of them. The following year they were remarkably scarce, and it was three years before they were again even moderately plentiful."

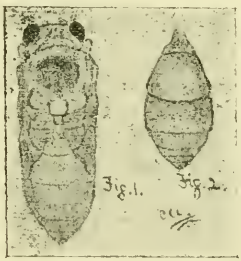
On the emergence of Listrodromus quinqueguttatus, Grav., with a description of its pupa.

By CLAUDE MORLEY, F.E.S.

My friend Mr. R. M. Prideaux, to whose generosity I owe many good insects, sent me, upon the 11th of May last, two pupæ of *Cynaïris argiolus*, each containing a single pupa of *Listrodromus quinqueguttatus*, Grav., from last autumn's ivy-feeding larvæ. The similarity of the parasitic pupa to its imago is to be seen in the tumidulous scutellum and the neuration of the wings, which, though of the same colour as the cells, is much elevated and inflated. In colour it is yellowish-white; the mesonotum and mesosterna are black, with the interpectoral line pale. The eyes are nigro-castaneous, and the ocelli and mandibular teeth, of which the upper is slightly larger than the lower, are castaneous and widely distended. All the limbs are detached and visible, the antennæ wings and legs being enclosed in separate sheaths, and the organs neatly folded upon the breast. The thorax is

of a somewhat more sordid colour than are the head, wings, and abdomen. There is no trace of lateral abdominal spiracles, and those of the butterfly's pupa, in which the parasite's ecdysis takes place, are, like the whole interior of the chrysalis, thickly covered with a silky coating, which would indicate a somewhat incomplete respiratory system. Its length is 7mm. Shortly before emergence the imago can easily be traced, since most of the markings, and especially the flavous outer-orbital, are plainly visible. The pale marking on the three basal segments is, however, not represented. The tumidulous post-petiole is, nevertheless, very distinct, though the antennæ, palpi, face, and wings are still enveloped in their white covering ; the first of these are flavous throughout at this stage, excepting the scape, which is piceous. The abdomen has now undergone considerable modifications, and its contour is quite changed. Nearly all the imaginal colouring is present, excepting those points already noticed.

As far as I am at present aware, *Listrodromus quinqueguttatus* confines its parasitism to *Cyaniris argiolus*, since it has been thence bred by Marshall in August, from larvæ on *Syringa* in July (cf. *Ent. Mo. Mag.*, xxxiii., 235), by Bignell, and, quite recently, by Mrs. Redmayne (*anteà*, p. 164), and Mr. Prideaux.



Pupa of Listrodromus quinqueguttatus, Grav., ♀.

Fig. 1 represents the pupa, and Fig. 2 the abdomen, shortly before emergence.

There was no trace outwardly of any emergence at 12 noon—at 2.0 p.m. however, I heard a gnawing noise which could be distinguished at the other end of the room ; it was similar, though scarcely as loud, as that produced by *Trichiosoma* when emerging.—This continued intermittently till 4.0 p.m., when I found an irregular, jagged hole had been effected through the *C. argiolus* pupa, at about the apical third, through which the flavous orbits of the parasite were plainly visible.—At 4.30 p.m., the hole was much enlarged, and both antennæ protruded.—At 5.15 p.m., the two front legs and the head were through it, and the insect was furiously struggling to lever up the cap, which had been (apparently) insufficiently cut round, with its prothorax, and biting the shell about its mouth, with occasional rests of a few seconds' duration.—At 5.30 p.m. this was continued, and several attempts were made to bring the mandibles on to the cap, but, these proving futile, the shell upon the breast continued to be demolished.—At 5.40 p.m., I raised the operculum, fearing the struggle for freedom might be lasting too long for the

insect's innate moisture to hold out, and it, as yet, appeared to be unable to escape for some time. The wings were somewhat crumpled, when it immediately emerged, but a few passes of the posterior tibiæ reduced them to their normal horizontally-folded position upon the back; the antennæ, palpi, wings again, and the posterior legs were successively rubbed dry (cf. Stone, *Zoologist*, xx., p. 7974) and, after a short walk, the wings were again attended to. The posterior tibiæ were next cleaned by the intermediate tarsi.* These processes were throughout accompanied by much waving of the antennæ vertically—never horizontally. Then there was a sudden, short flight, followed by a fall; two short walks; more attention by means of anterior tibiæ to palpi and antennæ; and the posterior tarsi were then cleansed beneath by one another. Another walk with the antennæ waving, and wide apart, but with never a tremor of the wings. The antennæ and palpi are not yet comfortable, so the anterior tibiæ are again in requisition, the antennæ being held deflected by crossed tibiæ while they are cleaned near their bases by the ligula. Then the *Listrodromus* appeared prepared for all contingencies, and met—the boiling water!

* In this section the females are provided with pectinated tarsal claws, the uses of which, I think, have not been explained—perhaps this is one of them.

NOTES ON COLLECTING, Etc.

Spring Lepidoptera.—Market Drayton.—The season has this spring been as bad as was last autumn. On April 2nd *Asphalia flavicornis* was hardly out, but on the 5th I obtained 25 in an hour, sitting on birch trunks, and the next day nine more. After the first two or three days after emergence they seemed to give up the habit of sitting on the stems, and to hide in other situations. On the 7th *Brephos parthenias* was well out, and I managed to take 30 in fine condition, but females were still in very small proportion, only about ten per cent. During the last evening or two *Taeniocampa stabilis* has been numerous at a sallow in my garden, but the wind has been so rough that I have not gone out with the tray into the woods, and the bloom is hardly fully out yet. *Cucullia chamomillae* has been intermittently emerging ever since Christmas in my breeding-cage, which was left in a room in the house without a fire; altogether six have thus come out before due time. I have now put them out-of-doors and the regular emergence has just started.—F. C. Woodforde, Market Drayton. *April 16th*, 1900.

Southend.—A visit during Easter week to a wood near here, for larvæ of *Sesia culiciformis*, was not a success, but larvæ of *S. cynipiformis* were found in nearly every oak stump—some fifty larvæ in all were taken.—F. G. Whittle, Marine Avenue, Southend. *April 19th*, 1900.

York.—The sallows here were in bloom late this year, and none seemed ready till about April 11th, and then the nights were very cold, a nasty snarling wind persistently blowing made it as unfavourable as possible for night work. By the 18th the weather became warmer, and I was tempted to Sandburn to try the bloom, but only for an hour or so. I managed to find a fair lot of *Panolis piniperda*, with a few of the commoner Tæniocampids. The following night

found me at Bishop Wood, Selby, to meet the Rev. C. D. Ash and Dr. Cassal. Mr. Hewett appearing also made up a quartette, chiefly in quest of *Pachnobia leucographa*. The sallow bushes here are mostly very large and high, really trees in one or two instances, standing about fifteen feet from the ground, which makes the use of large sheets a necessity. Umbrellas and trays are of little use. The four of us combined our sheets, which made a good display, and we were able to have them in the most suitable positions. The first shake at dusk brought down lots of moths, but by no means so great a number as I have seen on the sheets on such an apparently favourable night. *P. leucographa* was in fine condition, *Taeniocampa gracilis* scarce, as it usually is with us, *T. populeti* rather scarce and in poor condition, and little beside. The other bushes were all tried in turn, and in the end our united bag of *P. leucographa* appeared to be twenty-four, which was considered a poor one. On the evening of the 27th I went again to the wood, this time alone. The night was warm, and long before dusk the trees were alive with moths, which, however, were difficult to box, as they rose up very soon after falling on the sheets, but the result of the night's work was very good—between 40 and 50 *P. leucographa*, and a lovely pink *T. gracilis*, the first I have netted alive in my collecting experience. *T. opima* was present, but only one specimen was taken. I followed up my success by going again the next night, but I was not so fortunate, although I had a fairly good time. *P. leucographa* was most abundant, and another *T. opima* fell into the sheet in response to the repeated shakings of my boy assistant, who had to climb the tree to shake with effect.—S. Walker, York. *April 27th*, 1900.

Lyndhurst and Bournemouth.—Everything has been very backward this spring. I spent from April 12th-17th at Lyndhurst, but only took a few *Taeniocampa miniosa*, *Panolis piniperda* and *Xylina socia*, at sallows (one of the latter of which has laid a few eggs), with a few larvæ of *Cleora glabraria* and *C. lichenaria*, by beating. *Tephrosia bistortata* also was found on larch trees. Since my return I have taken several *Tephrosia crepuscularia* (*biundularia*) on larch, but I never knew the two species to occur at the same time in any numbers.—(Major) R. B. Robertson, Forest View, Southborne Road, Boscombe. *April 30th*, 1900.

Reading.—I am pleased to say this season has opened fairly well. The lamps produced during February and March *Hybernia rupicapraria*, *H. marginaria* (*progemmaria*) and *Anisopteryx aescularia* in abundance, and there were quantities of *Hybernia leucophaearia* on trunks and palings throughout February. *Nyssia hispidaria* was very scarce on oaks in early March. On March 13th a few *Cymatophora flavicornis* were found on the birch stems, and on March 17th I sugared for *Dasycampa rubiginea* and got two males only; plenty of *Tephrosia bistortata* were found on the larch trunks on April 3rd, and I may here remark that Major Robertson's record (*suprà*) of *T. crepuscularia* seems very early, I have never taken it here before May 10th. Amongst my *T. bistortata* this year are some very light ones, hardly to be separated from true *T. crepuscularia* (*biundularia*). I have never seen an early *T. crepuscularia* with *T. bistortata*, but have taken late *T. bistortata* with *T. crepuscularia* many times. On April 12th I took a female *Endromis versicolora*, and imagines also appeared in the breeding-cage a few days

later ; my pupæ were kept out-of-doors, spun up in chopped heath, in large flower pots, covered with muslin, all the winter. I never bring them in, neither do I those of *Stauropus fagi*. On April 28th I took two wild male *Lophopteryx carmelita*, on old birch trunks, but failed again this year to obtain a wild female. *Stauropus fagi* is late this year and after searching large beech woods all to-day I have only obtained nine males, inclusive of two large and very black ones. The females should be out in a day or two now, after this rain. Altogether my bag was a good one on this date, for I obtained also two *Notodonta trepida*, two *Lophopteryx camelina*, twelve *Drepana unguicula*, two dozen *Cyaniris argiolus*, eight *Euchloë cardamines* and *Pararge egeria*, with other small fry. The sallows were late owing to cold nights and winds, but they paid well for a visit, and *Taeniocampa munda*, *Panolis piniperda*, *T. gracilis*, *T. miniosa*, *T. populeti*, *T. stabilis*, *T. instabilis* and *T. pulverulenta* were in great abundance.—W. Barnes, 7, New Road, Reading. *May 8th*, 1900.

Lee.—The only species worthy of notice in this district, so far, are *Cyaniris argiolus* and larvæ of *Plusia moneta*. Of the former one expects to see a few examples each season, but this year it has been positively common, and during the first week of the month it was to be seen daily in considerable numbers. Finding a larva of the latter in my garden on the 8th, I visited that of a friend in which I took four in 1899, and secured twenty-six. These varied greatly in size, some being barely one-eighth of an inch long, whilst one was nearly fullfed. I fear this insect must now be regarded as a garden pest, it really does considerable mischief when it attacks the *Aconitum*. The leaves of this plant not being convenient for it to form a home from as are those of the *Delphinium*, it spins together the ends of the shoots, eats out their centres, and so causes the plants to be without bloom until fresh growth has been made.—B. A. Bower, F.E.S., 33, Eltham Road, Lee, S.E. *May 16th*, 1900.

Oxton.—This spring sallowing was very unproductive, but from ova of *Zonosoma porata*, obtained last July, I have bred more than 60 specimens, though none approaches that captured here by Mr. Bower last August. Unlike other districts from which reports have been made, *Cyaniris argiolus* has been very scarce this year, or the high winds prevented it showing itself. Little has been captured in the traps, the only insect worth recording being a black ♂ *Tephrosia bistortata*, on April 22nd. It is a large specimen, in finest condition, with rich ochreous fringes, similar in colouring to a black *Diurnea fagella* captured here last year.—E. F. C. Studd, M.A., F.E.S., Oxton. *May 25th*, 1900.

Lepidoptera in the Guildford district.—Bank-holiday, June 4th, was an ideal day for collecting, and lepidoptera were exceedingly plentiful. A run down to the Surrey downs, in the neighbourhood of Guildford, produced many interesting species. The commonest, probably, were *Callophrys rubi* and *Cyaniris argiolus*, some of the examples being, however, somewhat worn ; *Euchloë cardamines* was also abundant and very fresh. I found *Nemeobius lucina*, of which I brought away eleven, and I let quite as many escape as not being up to standard. *Polyommatus astrarche*, *P. icarus*, *Cupido minima* (one only), *Syrichthus malvae*, *Brenthis euphrosyne*, *Pararge megaera* and *P. egeria* were also on the wing, and in fine condition, whilst *Eugonia*

polychloros and *Gonepteryx rhamni* (plenty) represented the hybernators. *Macroglossa fuciformis* also was taken, and the regular down species *Euclidia mi*, and *E. glyphica* were in abundance, with a few *Phytometra viridaria* (*aenea*). *Euchelia jacobaeae* and *Ematurga atomaria* were also abundant and several *Venilia maculata* were observed.—E. P. Pickett, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *June 7th*, 1900.

Larvæ of Zephyrus quercûs.—I went to Abbott's Wood to-day. On the whole larvæ were scarce except those of *Zephyrus quercus*, which were in swarms.—H. M. Edelsten, F.E.S., Forty Hill, Enfield, N. *June 9th*, 1900.

Callophrys rubi in Sutton Park.—I found *Callophrys rubi* in abundance on Monday last, June 4th, in Sutton Park.—(Mrs.) Mary B. Redmayne, Chetwynd Place, Lichfield.

PRACTICAL HINTS.

Field Work for July and August.

By J. W. TUTT, F.E.S.

1.—The larvæ of *Eupithecia venosata* are to be found in seeds of *Silene inflata*, in July, those of *Eupithecia linariata* in seeds of *Linaria vulgaris*, in July and August, those of *Eupithecia pulchellata* in flowers of *Digitalis purpuralis*, in July and August, those of *Eupithecia plumbeolata* on flowers of *Melampyrum pratense*, in July and August.

2.—The larvæ of *Eupithecia valerianata* feed on flowers of *Valeriana officinalis* in July.

3.—The fullfed larvæ of *Anarta myrtilli* may be swept from *Calluna vulgaris* in July and again in September (Newman).

4.—The larvæ of *Malacosoma castrensis* can be reared readily on chrysanthemums; cover a plant with a muslin net, leave them until they spin up, then clip off the cocoons and put in a breeding-cage (Button).

5.—The imagines of *Acidalia emutaria* fly most freely at dusk, and may be found almost throughout June and July; there are two distinct broods (June and August) in the Isle of Wight, in the marshes fringing the Yar.

6.—The larvæ of *Xylina semibrunnea* are to be found on willow and ash in July (Croydon and Hackney Marshes) (Machin).

7.—The plants of *Typha latifolia*, with yellow central leaf, want cutting down in August for larvæ of *Nonagria arundinis*.

8.—The larvæ of *Eupithecia isogrammata* are to be found in flowers of *Clematis vitalba* in August; a little black spot distinguishes the affected flowers.

9.—The larvæ of *Eupithecia pimpinellata* feed on seeds of *Pimpinella saxifraga* in August and September.

10.—The larvæ of *Eupithecia subnotata* feed on the flowers and seeds of *Chenopodium* in August and September.

11.—Larvæ of *Euclidia mi* occur on sandhills feeding on sea marram-grass; drop off when disturbed and twist into grotesque attitudes and feign death; the white mottled colour and shape exactly imitates the exuviæ of snails (*Helix nemoralis*) (Kane).

12.—*Hadena pisi* feeds on ling, *Myrica gale*, and bracken. *Calocampa vetusta* feeds sometimes on *Myrica gale* (Kane).

13.—In early July the green larvæ of *Peronea caledoniana* feed upon *Myrica gale* (Pears).

14.—The second brood of *Platyptilia gonodactyla* feeds in July and August in a loose web on the underside of the leaves of coltsfoot (*Tussilago farfara*).

15.—The larva of *Chauliodus chaerophyllellus* makes large brown blotches on the leaves of *Heracleum sphondylium* during the summer and autumn months.

16.—In hunting for *Agrophila trabealis*, a switch for the purpose of brushing the herbage is of great advantage (Bond).

N.B.—Some hundreds of similar "Practical Hints" have been printed in the preceding volumes.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

NOTE ON THE LARVA OF GLYPHIPTERYX FUSCOVIRIDELLA.—On June 4th, 1898, I saw four imagines of this common species round a patch of *Luzula campestris*, in a meadow here. It struck me then, considering the known food-plants of other species of the genus *Glyphipteryx*, that *Luzula* would be a very likely food-plant for *G. fuscoviridella*. On April 14th, 1900, I noticed that many of the young leaves in the patches of *Luzula campestris*, in the same meadow, were quite brown. On digging up some of the plants I found the stems bearing brown leaves had been attacked by some internal feeding larva. One stem, with partially brown leaves, when split open, disclosed a stout whitish larva, resting head upwards in the interior. Among the roots of a neighbouring stem I found another similar larva, already surrounded by an open net-work cocoon. On April 18th I searched again and found a third larva, head downwards, in a stem of *Luzula*. The first larva pupated without forming any cocoon, and is now, I fear, dead. The third larva, after living some days out of sight among *Luzula*, planted in a flower pot, came to the surface, and was subsequently attacked by mould. The larva in the cocoon had pupated when I again looked at it on April 17th. Exactly four weeks afterwards it produced a fine imago of *Glyphipteryx fuscoviridella*. The following description of the larva was made:

The larva is stout and fairly cylindrical in section. The head is very small. The body gradually increases in bulk, to the 3rd or 4th abdominal segments, when it somewhat abruptly decreases to the 9th abdominal. The colour of the head is pale shining amber, that of the body very pale ochreous, becoming pinkish-brown on the dorsal area. The usual tubercles are small, but furnished with a stout bristle. The legs are whitish, banded with ochreous, and the weak prolegs very pale ochreous. The spiracles are black, connected by a thin smoke-coloured line. The plate on the 1st thoracic segment is large and pale ochreous. The 8th abdominal segment has three blackish horny dorsal spots, the central one of which is transversely elongated. The 9th abdominal is armed anteriorly with a dark horny ochreous dorsal band, and a very strong dark ochreous suranal plate with central depression, and four or more points each bearing a bristle.

There can be no doubt, I think, that the larva of this species feeds, at least in the spring, on the inner pith of the young shoots of *Luzula campestris*. Probably it also attacks *L. pilosa*. The end of March would be the best time to search for the larvæ. The chief causes why the larva of this species has hitherto remained undetected appear to

be, firstly, the absence of any incentive among collectors to breed the species, owing to the ease with which the imago can be captured, and secondly, the difficulty of guessing at the right pabulum among the great variety of plants generally growing in the localities haunted by this species.—Alfred Sich, F.E.S., 65, Barrowgate Road, Chiswick. *May* 23*rd*, 1900.

CURRENT NOTES.

At the meeting of the Ent. Soc. of London, on May 2nd, the Rev. Theodore Wood exhibited a specimen of *Carabus auratus*, L., taken in either June or September, 1898, by Mr. Ferrand, of Littlefield House, Exmouth, on the Haldon Hills, in the neighbourhood of that town. Mr. McLachlan also exhibited an example of *Rhinocypha fulgidipennis*, Guérin, a brilliant little dragon-fly of the subfamily *Calopteryginae*, a native of Cochin China, which, so far as he knew, had not been captured since prior to 1830. It had been in M. Guérin's hands, and Mr. McLachlan had received it from M. René Oberthür.

At the same meeting Dr. T. A. Chapman exhibited various specimens illustrating *Acanthopsyche opacella*: fresh females showing the six nearly complete rings of silky wool with which she is clothed; specimens preserved *in cop.*, showing the exact position of the male moth in the female case, and the position of the two moths in relation to the female pupa-case. It was incidentally mentioned that the inflation of the male abdomen with air was observed to be the main force employed in advancing the male abdomen into position, and that observation of the immature wing threw considerable light on the real neuration in this species.

At the same meeting Mr. Barrett exhibited specimens of Heterocera destructive to the fruit crops of South Africa. Among them *Sphingomorpha monteironis*, Butl., known as the Fruit Moth in Cape Colony—a bold and powerful insect, with a sucking tongue strong enough to pierce the sound skin of a peach or fig. The presence of a light does not appear to disturb it, so that examination of its methods can be readily made, when it can be seen that it does not take advantage of the natural opening into a fig, or of a crack or other injury to a peach, but deliberately pierces a hole which afterwards shows as a small round spot, from which decay invariably results. It seems a matter of indifference to the moth whether the fruit has fallen, or is on the tree, ripe or unripe. With regard to *Achaea lienardi* and *Serrodes inara*, the two species are restless and timid, and, therefore, more difficult to observe. In the present season, however, both have been extremely abundant, and have been seen at apparently uninjured fruit, so that it seems they are capable of equal destruction, and this is the more probable, as all the species alike are provided with somewhat saw-like teeth toward the tip of each section of the sucking apparatus.

Mr. W. A. Luff has now given us an up-to-date list of *The Insects of Alderney*. It occupies 23 pp., and includes all the orders that have been worked, and the additions, made by Mr. E. D. Marquand recently, are highly suggestive of what still remains to be done before it can be really said that the fauna of the Channel Islands is known. Hitherto Mr. Luff has worked almost alone, helped only in Guernsey by the

Rev. F. E. Lowe, and incidental lists furnished by casual visitors. Of the Lepidoptera, *Sesia muscæformis* is abundant, *S. ichneumoniformis* was captured, and many *Callimorpha hera* were seen, whilst amongst the Coleoptera, *Rhizotrogus aestivus*, not yet recorded as British, has been taken, several specimens of a curious aberration (without a yellow stripe on the elytra) of *Cryptocephalus rittatus*, another non-British species, were captured, as also were *Necrophorus germanicus*, *Meloë brevicollis*, &c. Among the Hymenoptera, *Andrena flessae* has not yet been recorded as British, and a curious dark-underside form of *Bombus smithianus* is of especial interest, the southern ones being usually pale beneath, although the Scotch ones are nearly black. The only dragonfly that has been captured is *Sympetrum fonscolombii*, but there are many other interesting species in the list, which well deserves the study of all interested in the geographical distribution of species.

The members of the Yorkshire Naturalists' Union went for their first outing this year on May 19th, when the country around Hornsea Mere was investigated. At the meeting held in the evening, under the presidency of Mr. G. T. Porritt, eleven new members were elected, and the officials of the various sections sent in their reports.

REVIEWS AND NOTICES OF BOOKS.

Proceedings of the South London Entomological Society, 1899.*—This is an interesting volume of 120 pages including a good index. It begins with a full paper by Dr. Chapman on the evolution of the lepidopterous antenna. Like all this author's work it is full of accurate observation and careful reasoning. Differing from Dr. Jordan, Dr. Chapman's view is, that the primitive lepidopterous antenna had sense-hairs with scales regularly distributed amongst them, and from this various lines of evolution started, the main line having a strong tendency for scales to disappear ventrally and hairs dorsally, the final tendency being to the usual form in the obtect Heterocera, of hairs ventrally, and two rows of scales dorsally. There is a suggestive paper by Mr. Tutt on "Metamorphosis," a subject of permanent interest, affording scope for much speculation; it is a clear exposition of the opinions most prevalent at the present time. There is a wide range of subjects—if not embracing, like Father O'Flynn's learning, everything from Theology down to Conchology—still justifying the title of Entomological and Natural History Society. Mr. Scourfield discourses on the water fleas, and the presidential address of Mr. Harrison gives what is known up to date on Telegony, the theory based on Lord Morton's experience with the foal of a chestnut mare whose first husband was a quagga, a theory on which doubts have been increased by the "Pennycuik" experiments of Professor Ewart with zebras and horses. Another question of the day, that of malarial fever and mosquitoes, is included in the presidential address. It seems that a particular kind of mosquito, the *Anopheles*, and a human being must co-operate to preserve the life of the interesting organism which causes malaria, so that if you can exterminate one of these species malaria will be done for. The *Anopheles* will, of course, be the one to go, and

* Published at the Society's Rooms, Hibernia Chambers, London Bridge, S.E. Price 2s. 6d.

would therefore seem to be in a bad way, more especially as it is found that a little kerosene dropped on the surface of the puddles he frequents puts an end to him. The "mere collector" will perhaps take note of this, in order that he may lay in a store of the *Anopheles* before it is too late; we are afraid, however, that it will be long before the species will be extinct. There is a pleasant account by Mr. Adkin of summer days by the seaside, including an important observation of the immigration of *Pieris rapae*. We are glad to learn from this paper that *Polyommatus corydon* and *P. bellargus* are as abundant as ever on the Sussex downs. Hermit crabs and land shells are among the objects observed and noted, as are many rare plants; and most of the orders of insects have their part in the *Proceedings* of this society—Lepidoptera, Coleoptera, Hemiptera, Neuroptera, Odonata, Hymenoptera, and Diptera. There were 23 meetings in the year, at which, apart from the exhibition of specimens—in itself a sufficient *raison d'être* for such a society—biological questions of importance were discussed, and the society may be congratulated on its success and usefulness. Some of the papers published by it are distinctly valuable from the point of view of science, and the interchange of ideas and opinions at the frequent meetings of the society cannot fail to bring recruits to the ranks of those who, as members of the chartered Entomological Society and other leading scientific societies, have done so much to promote biological knowledge in recent years.—F.M.

The Natural History of the British Lepidoptera (Swan Sonnenschein and Co., Paternoster Square, E.C.).—The second volume of this important work described by Mr. Merrifield (*Entomologist*, April, 1899) as being "in comprehensiveness and fulness of detail, on all points of interest to the biologist, the systematist, and the collector . . . . without a rival," has now been published. It consists of 584 closely printed demy 8vo. pages, on good paper and well bound in cloth. It has an index consisting of 30 columns of references merely to the names of the species dealt with and referred to, and the whole book contains, not only a complete *resumé* of the families dealt with culled from all possible sources, but a large mass of original matter written by the author and those entomologists whose help he was fortunate enough to obtain.

The book consists of two parts: (1) The introductory part (100 pages) containing chapters on "Metamorphosis in Lepidoptera," "Incidental phenomena relating to Metamorphosis in Lepidoptera," "The External Morphology of the Lepidopterous pupa," "The Internal Structure of the Lepidopterous pupa," and "Phylogeny of the Lepidopterous pupa." (2) The systematic part (469 pages) dealing with the species. In this section each species is described under a series of headings—Synonymy, Original description, Imago, Sexual dimorphism, Gynandromorphism (descriptions of all known forms), Variation (with original descriptions of all known forms), Comparison with allied species, Egg-laying, Ovum, Habits of Larva, Larva, Variation of Larva, Comparison of Larva with those of allies, Cocoon, Double and Composite Cocoons, Variation in colour of Cocoons, Parasites, Food-plants, Habits and Habitat, Pupal Habits and extended duration of Pupal stage, Time of appearance (details for phenological work), Localities (county lists for the British Islands), Distribution (classified lists under the countries in which the species

occur). The headings just enumerated are those under which *Lachneis lanestris* is described. In addition to most of these there are other headings in the Psychids—Case, Puparium, Dehiscence of Pupa, &c. There are also full details of the superfamilies, families, subfamilies, tribes and genera under which the species have been described.

The feature of this volume will be considered, undoubtedly, the very full and complete monograph of the Psychides. This exceedingly interesting group has been hitherto practically unknown to British lepidopterists, and such authors as have dealt with it have largely copied their descriptions and notes from the continental authorities, with the result that a very large proportion of the little that has been published about them in Britain is erroneous. In this work almost every British species of the Micro-Psychina, as well as the Macro-Psychina, has been worked out in detail and there is no doubt that British lepidopterists will now be far ahead of their continental brethren in their knowledge of this group, especially as in the Micro-Psychina the author has given a summary of the whole of the known Palæarctic species. A full consideration of their position with regard to other superfamilies and *inter se* has been given, and the whole group has been so thoroughly overhauled that the work will be invaluable to continental as well as British lepidopterists.

The superfamily *Lasiocampides* or *Lachneides* has been similarly treated. The whole of the family has been considered historically and the positions of the various authorities discussed. With the exception of a few instances, the author finds himself in agreement with Aurivillius as to the names to be used, but the life-histories have had to be worked out *de novo*, on modern lines, to determine the characters on which the classification of the group should be based.

The work has been so arranged as to make the facts of the greatest possible use to the synonymist, the systematist, the biologist, phenologist, and the students of variation and distribution. At the same time the collector has unequalled lists of food-plants, dates of appearance, full county lists, full account of the habits (larval and imaginal) and habitats, mode of pupation, &c., in such detail as has never been offered before.

Help has been obtained from a very large number of our best lepidopterists at home and abroad. Lord Walsingham, Messrs. Durrant, Kirby, and Prout are almost entirely responsible for the synonymy, Dr. T. A. Chapman and Mr. Bacot for the life-histories, descriptions of larvæ, pupæ, &c. Some 250 local and county lists have been overhauled and put together for the localities, which form a really good series of county lists. Special help has been obtained from those who know any species particularly well, whilst considerable help has also to be acknowledged from Messieurs Oberthür, Dupont, and Dr. F. J. M. Heylaerts, of Breda.

As the work can only be continued by the goodwill of subscribers, it is hoped that every entomologist who is anxious that we should have a series of books on British lepidoptera, that shall be far in advance of anything before offered to the entomological public, and form a real work of reference, based on the lines of modern science, will support this undertaking, not only by becoming a subscriber but also by inducing his friends to do so.—H. E. P.

Erratum.—Page 178, line 19, for "pl. iv.," read "pl. vi."

Field Meeting of South London Entomological and Natural History Society, May, 1900.

Photo. by F. Noad Clarke.

F. M. B. Carr. N. D. Warne. S. W. Kemp.
G. B. Browne. A. Cant. S. R. Ashby. W. West. R [illegible] E. B. Carr. R. Ficklin.
T. A. Chapman. W. H. MacG[illegible]

The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XII. No. 8. August 1st, 1900.

Field Meeting of the South London Entomological and Natural History Society, May 1900 (*with photograph*).

Some twenty-eight years ago the South London Entomological and Natural History Society first came into existence, and the late Mr. J. R. Wellman was, from 1872-1874, its first President. From 1872 until now it has been a progressive institution, full of life and virility, and much of its strength has undoubtedly been due to a well-organised band of excellent entomologists, who, at weak periods, have provided the sinews of war, and during strong ones have placed its finances on a sound basis, and nursed it until it has now undoubtedly become one of the strongest societies of its kind in the country. When one looks through its list of members one is not surprised at the success achieved, and the list of past presidents contains the names of many men well-known in the annals of entomological science. The way in which old members have supported the society after their more active period of work has been passed, is worthy of all praise, and only one past president, Mr. A. B. Farn (1875-1876), is missing from the current roll of membership, except those that have passed the bourne whence no traveller returns—J. R. Wellman, J. T. Williams, W. H. Tugwell, and, dearest of all old friends, J. Jenner Weir. Mr. J. P. Barrett, who has disappeared from active work for a score of years, appears in the current roll of members as having been elected in 1900, yet he was Secretary of the Society in the "seventies," President in 1877, so that he is at once one of the oldest and youngest of members.

One of the features of the summer work of this Society is the organisation of a series of field meetings. One of these was held at Oxshott, on May 19th, and our photograph is reproduced from one taken at the end of a pleasant day by that prince of photographers, Mr. F. Noad Clark, to whom we are greatly indebted for the original. Seeing that the photograph included so many entomologists with whose personal appearance our provincial readers would be sure to wish to be acquainted, we considered we could not do better than have a reproduction made for the magazine. The "Carl Hentschel Co." has done its share of the work satisfactorily, and we have no doubt the printer will do his.

Of the members present many of the younger ones have still to win their spurs as entomologists in the strict sense, although their keenness as collectors leaves little doubt that this will come in due course. Of the older hands there are several to whom entomologists generally

owe much, and the South London Entomological and Natural History Society still more.

First and foremost of these is Mr. R. Adkin, F.E.S., to whom the Society undoubtedly owes more than to any other individual member. Three times its President (1886, 1887, 1897), and for several years its Treasurer, he stands *facile princeps* of all those who have worked for the advancement of the Society, and as a keen lepidopterist will be known to all our readers. Second only to Mr. Adkin, in his solicitude for the Society's welfare, is Mr. R. South, F.E.S., twice President (1885 and 1886), the editor of *The Entomologist*, and responsible for much—very much—of the systematic work that has been done on the lepidoptera of Japan. Next come Mr. S. Edwards, F.Z.S., F.L.S., F.R.G.S., F.E.S., &c., and Mr. H. J. Turner, F.E.S., the twin Secretaries for many years past. No work that these two men can do for the Society is too great, and the generosity of Mr. Edwards is phenomenal. Besides the presentation of an excellent lantern to illustrate the lectures given and papers read, almost every really valuable work on natural history that is too expensive for the Society to purchase, finds its way to the Society's bookshelves, thanks to Mr. Edwards, and in this he is ably seconded by Mr. N. F. Warne, one of the members of the well-known firm of book-publishers in Russell-street. The present President, Mr. W. J. Lucas, B.A., F.E.S., a first-class all-round naturalist, will be best known to our readers by his recent excellent work on *British Dragonflies*, whilst Major Ficklin, keen lepidopterist and excellent raconteur, and Mr. W. West, L.D.S., who adds microscopy to his love for entomology, represent the past presidents, having been in office in 1880 and 1884 respectively. Dr. T. A. Chapman needs no introduction to our readers; an unlimited capacity for hard work, a scientific training that can be attained only by entomologists who follow medicine as a profession, an omnivorous reader, a logical reasoner, and a profound thinker, these are among the factors that have united in placing him in the very first rank of the entomologists of his time, and a giant among the pigmies that surround him. His refusal to occupy the presidential chair for the current year was a great disappointment to all the members, but we trust that ere long he will be prevailed upon to add his name to an honourable list. Dr. Fremlin, who has still to make the name in entomology that he has made in bacteriology, is the prospective President for 1901. Mr. A. Cant, F.E.S., the prince of setters, Mr. J. H. Carpenter, F.E.S., keen on the elucidation of all details of the life-histories of our British butterflies. Mr. R. Ficklin, one of the original finders of *Drepana harpagula* (*sicula*) in Leigh Woods, and Mr. W. J. Ashdown, an exceedingly keen coleopterist, will also be known to most, and if we have to regret the absence of Messrs. A. Harrison, T. W. Hall, W. West (Greenwich), H. A. Sauzé, H. Moore, A. M. Montgomery, E. Step, and other active members of the Society from this photograph, we still trust that some future occasion will give us the chance of obtaining another containing at least some of those who have done so much for the Society. By this means we hope that these entomologists may become something more than names to those who have not yet had the pleasure of attending one of the meetings, and thus coming into personal contact with them.

The connection between Primary and Secondary Sexual Characters in Lepidoptera.

By J. W. TUTT, F.E.S.

Not the least interesting of the various points discussed in Dr. Wood's recent paper on certain Lithocolletids (*Ent. Mo. Mag.*) is the final chapter on the biological aspects of the male genitalia. The working theory advanced is certainly far-reaching in its application, and one suspects that some first class entomologist will ere long put it to the test of practical application.

One is, indeed, astonished that there should be the remarkable variety which Dr. Wood shows to exist in the structure of these organs among such small insects, and that closely allied species should present such wide differences is also sufficiently striking, and one is inclined to agree with the author that this variation is not solely to prevent unnatural unions. It is not, however, this particular view of the subject to which we wish to refer, but rather to a side issue growing out of one of the points raised by Dr. Wood.

Dr. Wood concludes that "much of the variation that we find in the male appendages is of a neutral character, neither useful nor hurtful to them as clasping organs." . . . and that "all this amazing fertility of shape is dependent in some way upon the presence of the reproductive glands or testes, for it can scarcely be doubted that could they be removed at a sufficiently early date in the life of the larva, the transformation of the last larval segment into the armature of the imago would not occur, much as the emasculation of the deer prevents the development of its horns." He then goes on to suggest that the office of the reproductive glands (testes or ovaries) is twofold: (1) The production of spermatozoa or ova. (2) The control of the development of the soma. These two functions are rarely in full activity at the same time . . . . and the organs may be capable of discharging one set of functions and incapable as regards the other. He says: "The functions then of the reproductive glands are twofold; on the one hand they supply germ-matter that resides within them with the means of developing and multiplying; and, on the other hand, they modify and even originate those parts of the soma which are lumped together under the name of the secondary sexual characters. Now, the more minutely we investigate and classify our insects the more commonly do we come upon instances in which the only coarse and tangible characters by which one species may be distinguished with certainty from another closely allied to it, lie in these secondary sexual structures; in fact the structures constitute for us the specific characters. Hence the conclusion seems inevitable, that many of the characters that go to form a species have their start in some primary change in the reproductive glands and that these organs are not merely passive agents concerned in the nourishment of the germ-matter, but do themselves take an active and creative part in the genesis of species."

Since I have been studying the Lachneids (Lasiocampids) I have been brought face to face with the necessity of forming some sort of opinion as to the cause of the external peculiarities of gynandromorphism, and some time since I came to the conclusions that Dr. Wood has so ably formulated. I have already stated, in the second

volume of *The Natural History of the British Lepidoptera*, p. 446, the view that the modification of the sexual organs themselves is the cause of all the peculiarities of the secondary sexual structures—antennæ, wing-colour, wing-shape, &c. Popularly, specimens that present a combination of the external secondary sexual characters, are termed gynandromorphous, but the actual experiments in which it has been proved that the modification of the secondary sexual characters have been really accompanied by the modification of the primary sexual organs are very few indeed, and gynandromorphism is, as a rule, applied to all individuals that exhibit a combination of the secondary characters recognised as belonging to different sexes, without the slightest real knowledge that the primary sexual organs have undergone any modification, much less whether such modification is really the motive force that has developed the secondary sexual peculiarities exhibited.

A superficial examination of many specimens, however, leads one to suppose that such is the case, and that the modification of the sexual organs in the slightest degree brings about, as we have just stated, a corresponding difference in the secondary structures, and that the mixed characters shown even by the same wing in some very aberrant examples, are due to the development of certain male generative structures among those of the female (or *vice versâ*), and it may be that the development of testicles on one side of an insect and ovaries on the other, results in those perfectly symmetrical specimens which show antennæ, wings, legs, &c., with male characters on the one side and female characters on the other. At any rate it is quite certain that the external parts of the sexual organs follow a modification parallel to those of the secondary sexual organs in many such specimens.

It would be exceedingly interesting if all those lepidopterists who possess specimens that show modification in the direction here indicated—either as to antennæ, legs, or wings, where these differ in a species as secondary sexual characters—would record such. One is convinced that there are many specimens in our cabinets showing externally greater or less signs of gynandromorphism, which have not been detected owing to the partial and piecemeal and sometimes apparently insignificant nature of the structures involved.

One important feature of Dr. Wood's paper, however, is his attempt to show by what means or through what channel the close relationship between the primary and secondary organs is effected. He states that until recently no other explanation was possible except the one that it was due to the agency of the nervous system, some stimulus or impression being conveyed from the reproductive glands to that part of the nervous system presiding over the development of any particular secondary character, in consequence of which the latter takes on its proper growth and form. He considers, however, that the comparatively modern discovery that the glands of the body, besides the functions of producing their ordinary secretions which find their way into the ducts, have also the power to produce what may be termed "internal" secretions, which pass back into the blood, where they probably act as highly specialised foods necessary to the well-being of the organism, helps us, and it is in this direction that he would explain the phenomena presented by the relationship known to exist between the primary and sexual organs, and instead of the "nerve-bond"

between two correlated parts, he would substitute a "food-bond," or, in other words, a chemical one, and he adds: "To revert to the illustration already borrowed from the stag, if the influence be purely nervous, as is commonly believed, the path by which it is conveyed all the way from the testes to the horns over the intricate and interlacing lines of the sympathetic system is hard to conceive, but substitute a food-bond, and the connection is at once obvious and easy of comprehension."

After showing that in plants structure largely depends upon food, and that the profound modification of the plant protoplasm in the formation of galls, is possibly due to the fact that the peculiar substance injected into the tissues of the plant plays the part of food, "not however in the ordinary sense of nourishing, but rather in that of combining and uniting with the protoplasm or one of its constituents, after the manner of a chemical agent, and so altering its molecular constitution and affinities as to change it into something altogether different from what it was before." He then concludes: "of such a kind is the nature of the 'food-bond,' which I would suggest may underlie some of the phenomena of correlation, that is, certain substances are secreted by the controlling organ, which combine chemically with the protoplasm of the correlated part and endow it with new capabilities."

If we are unable to accept this view, it is not because we do not fully appreciate the exceedingly clever suggestion made by Dr. Wood to explain a difficult subject, but because we are unable to apply his reasoning to definite cases that have come under our notice.

Take for example, first, the case of those bilaterally gynandromorphous examples of lepidoptera—*Trichiura crataegi*, *Lasiocampa quercûs*, *Malacosoma castrensis*, *M. neustria*, &c.—that are known to all entomologists, and several of which we have described at length in our recently-published second volume of *The Natural History of the British Lepidoptera*. In these the external portions of the sexual organs are on one side male, on the other female, presumably the internal portions of the organs are so also, and as a result the side which possesses the seminal glands presents all the secondary sexual characters of the male—antennæ, legs, shape of wings, markings, colour (both of head, wings, and thorax)—whilst the side which possesses the ovaries presents all the secondary sexual characters that distinguish the female. So complete is the division that a central line divides the insects into two distinct halves, male on one side female on the other. I cannot understand a food-bond that is not diffused throughout the whole system. Are we to understand that the internal secretions from the ovaries of an individual such as I have described can be absorbed only by one side of the insect, and similarly that the internal secretions of the seminal glands can only be absorbed by the opposite side?

A second class of gynandromorphous individuals differs widely from the first. These appear to have the ovaries developed in part on either side of the insect and similarly the seminal glands. Such individuals will present the general characters of a male or of a female, according as the male or female genital organs are best developed, with sundry areas and structures on either side of the insect showing characters of the opposite sex to that which is generally exhibited by the insect.

Thus the general appearance of the insect may tend to be male, with the whole (or part) of the antennæ, wing-markings, colour, legs, &c., showing characters normally associated with the female sex. In such a case as this, how can the food-bond act? It is difficult for me to see how it is possible for a portion, say of an antenna or wing to absorb certain food-elements in the blood, even in the direction indicated by Dr. Wood, to the exclusion of the other parts of the same structure, nor must it be overlooked that whereas the genital organs undergo no histolysis, the fat-body from which the nutriment for the building up of these structures is largely obtained, does undergo this process before the histogenesis of many of the imaginal tissues at least can take place.

Perhaps Dr. Wood or some other biologist can help me, but at present I am groping in the dark. I no more like the nerve-bond than does Dr. Wood, as an explanation of the phenomena, yet it seems to me that at present it is safer than the "food-bond," so far as I understand it. I cannot conclude this short note without thanking Dr. Wood for his very clever and interesting biological survey of the subject, and I suspect that it is I who am at fault and that Dr. Wood's theory is more sound than it appears to me to be.

Further notes on the Fumeas.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Since writing my previous note on the Fumeas (*antè*, pp. 59-62, 89-93, 121-125) I have had an opportunity of critically examining the specimens of this group in the rich collection of M. Constant. It contains several interesting forms, which illustrate very well the great necessity there is for greater attention to these rather neglected little moths.

The series of six specimens representing *Masonia subflavella* is calculated to throw grave doubt on the real distinctness of that species. It consists of one specimen that may be *M. subflavella* (or *M. crassiorella*), one that is certainly a form of *M. crassiorella* with 22 antennal joints, whilst the four remaining specimens are the form I have called *Bruandia reticulatella* var. *obscurella*, and which may be the French form to which Heylaerts has given the name *norvegica*. These specimens of M. Constant's have 22 antennal joints and a spur length of ·58.

In the series of *M. crassiorella* is a remarkable specimen marked "D" that did not strike me as being *B. reticulatella* var. *obscurella*, yet had some features of that form. I am not prepared to name it as a distinct species till further specimens are forthcoming, but I think it is a new species. Its expanse is 15mm., it is more definitely reticulated than *B.* var. *obscurella* is, it appeared to have a simple median vein, but this is not perhaps certain, as I may have made my note to that effect without making quite sure, fearing to damage the specimen. It has 22 antennal joints and a very short tibial spine of length ·53. This is short for *B. reticulatella*, but is probably within the extreme variation possible for that species.

Amongst the *Fumea casta* (*intermediella*) are two specimens taken at Cannes, which may be a variety of *M. subflavella*, but are more probably a distinct species. They expand 13mm., have 21 joints to

the antennæ, simple median, and a spur length of ·69. Their appearance is remarkable, they have not the brownish-yellow of *M. subflavella*, but a dark leaden or dove colour, with a smooth velvety texture or surface, and very notable white cilia. The specimens are marked "B." I would name them *ciliella*.

The *affinis* taken by Rebel in Dalmatia, are dark, have only 22 joints to the antennæ, these are certainly not identical with the *M. affinis* with 24 antennal joints, but may be a local race or variety. Amongst them are one or two with pale cilia, and the velvety appearance and dove colour of *ciliella*, these are, however, large, being 15mm. in expanse.

There is also a pretty little series named *Bruandia reticulatella* taken by Rebel, in Dalmatia. They are not very recent specimens, but are very fresh as regards the blackness of their colouring. M. Constant had not a typical *B. reticulatella* with which to compare them. They are distinctly smaller than the type, *viz.*, 12mm., and the reticulations are very marked and distinct, but somewhat obscured towards the base in some specimens. I could not very easily make out the divided median. The colour of the wings is a very dark smoky, almost black, dull and unpolished. The tibial spur is ·61 and ·60 in two different specimens. This is long for *B. reticulatella*. I have, however, measured a *B.* var. *obscurella* as ·59. I do not see sufficient ground for separating these from *B. reticulatella*, but they have a very different facies from *B.* var. *obscurella*, and it is hard to believe they are the same species; nevertheless, I am equally unable to say that *B.* var. *obscurella*, is more than a variety of *B. reticulatella*. The ♀ has 11 to 13 antennal joints (counting difficult), 5-jointed tarsi, more hair on the sides and dorsum than *F. casta* var. *nitidella*. The case varies in size and materials, and is like that of a short thick *F. casta*.

Is the separation of the Papilionides from other butterflies warranted?

By J. W. TUTT, F.E.S.

We have just received, thanks to the author, another of Professor Grote's papers on the classification of the butterflies, entitled *Phylogenie und Begrenzung der Tagfalter-Familien*. It is now well known that the author divides the butterflies into two superfamilies—Papilionides (consisting only of the *Papilionidae*, *Teinopalpidae* and *Parnassiidae*) and Hesperiades (including all other butterflies, the *Megathymidae*, *Hesperiadae*, *Lycaenidae*, *Nemeobiidae*, *Libytheidae*, *Nymphalidae*, *Pseudopontiadae*, *Dismorphiadae*, *Pieridídae*). The great peculiarity by which the Papilionides differ from all the other butterflies is in the anal nervure of the forewing, which, in this superfamily, reaches the inner margin, whilst in the Hesperiades (*i.e.*, all other butterflies) it is either bent up towards the anal nervure, or is absent. In this latest work by Professor Grote the anal nervure is called A_2, whilst the supplementary anal nervure (that on which so much stress is laid) is called A_4 in the Papilionides, and A_3 in the other butterflies. Now we wish to suggest that this naming involves a false proposition, and that A_4 and A_3 are homologous, in other words, that $A_4 = A_3$. Dr. Chapman informs us that a study of the development of this nervure in the Papilionid and Pierid pupæ

suggests that this is so. It is, of course, a very important fact that A_4 in the Papilionid imago reaches the inner margin of the wing, whilst A_3 in the other butterflies does not, and the difference in direction of this nervure is sufficient to give considerable importance to the character in any system of classification; but if, as we suggest, the nervures A_4 and A_3 are homologous, will the character bear the weight that Professor Grote seeks to put on it? In other words, does the mere direction of this nervure imply so much as the author asserts? The value which the author asserts that this difference warrants is an exceedingly great one, so great that in his "Stammbaum" he makes the PAPILIONIDES have an entirely different origin from the HESPERIADES, which he derives through the TINEIDES from the MICROPTERYGIDES, whilst the PAPILIONIDES come from an undefined and unknown source, quite distinct, however, so far as one can judge, from that postulated for the other butterflies. We wish to suggest that the character that our author brings forward does not justify these conclusions, and, until Professor Grote can show us that the evolution of nervure A_4 is different from that of A_3, and that A_4 differs from A_3 in reality and not as a mere matter of terms, he must forgive us for not accepting his conclusions. What is now wanted is a series of carefully prepared diagrams, illustrating the point that Professor Grote urges, *viz.*, that A_4 and A_3 are not homologous, made from the pupæ during development. We suspect that such a set will show, on the contrary, that they are homologous, and that the great difference urged by the author as existing between the PAPILIONIDES and all other butterflies, has, in fact, no existence. Further details based on the imagines will not push the matter any further. The opinion that there are theoretically "four anal longitudinal nervures to the fore-wings of butterflies, of which the PAPILIONIDES have lost the third, and kept the fourth, whilst the HESPERIADES have lost the fourth and kept the third," has been repeated in a large number of journals—German, American, and English. To repeat this statement again and again will not convince us that the A_3 of the HESPERIADES and A_4 of the PAPILIONIDES are not homologous. What we want are fresh facts based on the pupa—and to be learned only during pupal and imaginal development.

The Guests of Ants and Termites (*with Plate*).

By E. WASMANN, S.J. (translated by H. DONISTHORPE, F.Z.S., F.E.S.).

(*Concluded from p.* 150.)

There exists, as I have already mentioned, many intermediates between the tolerated and the genuine guests, as also between the tolerated and the hostile guests. *Smilax pilosus* is an example, uniting the qualities of a protected species to the yellow hairs of a true guest. It even appears, according to Dr. Brauns' observation on the Micro-hymenoptera, that there is a connection between true Parasitism and Symphilie. In many cases, therefore, it remains doubtful to which of the four classes an insect is to be placed even when its life-habits are known. Just one word about *Hetaerius ferrugineus* and its allies. What seems easier at first sight than that a small Histerid, which already possesses in its oval shape a kind of protection, should force the ants to receive it as a lodger, and which would be tolerated because of its

being unattackable, and that finally the ants, taking pleasure in licking it, would elevate it to the rank of a true guest. But it is not as simple as it appears. In my observation-nests I have had a number of *Hetaerius* for more than five years, and I have come to the conclusion that it would be better for this species to be merely tolerated. It is in truth licked by the ants, but this is not to its advantage, as the ants do not feed it. It is often in great danger. *Formica sanguinea* and *pratensis* play with it for a quarter of an hour at a time, like a cat plays with a mouse, trying to get hold of its jaws, so it is often hurt. Once a *Hetaerius* was so badly used by a *Formica sanguinea* that it was half killed and nearly devoured. Whilst licking the wounded beetle the ant's greed had been awakened.

So as to give before we finish a systematic review of the classes, orders and families of the guests of ants and termites, I have added to this treatise a table taken from my *Kritischen Verzeichniss der myrmekophilen und termitophilen Arthropoden*. (Where the Termitophila are not mentioned, the family possess only Myrmecophila.)

INSECTA.
(Myrmecophilous 1177, Termitophilous 105.)

COLEOPTERA.
(Myrmecophilous 993, Termitophilous 87.)

CICINDELIDAE (0).
CARABIDAE.
- Myrmecophilous Carabides (3).
- Termitophilous Carabides (5).

STAPHYLINIDAE.
- Myrmecophilous Staphylinides (263).
- Termitophilous Staphylinides (59).

PSELAPHIDAE.
- Myrmecophilous Pselaphides (113).
- Termitophilous Pselaphides (5).

CLAVIGERIDAE (89).
PAUSSIDAE (169).
GNOSTIDAE (2).
ECTREPHIDAE (7).
SCYDMAENIDAE (32).
SILPHIDAE.
- Myrmecophilous Silphides (35).
- Termitophilous Silphides (1).

TRICHOPTERYGIDAE (14).
ENDOMYCHIDAE (9).
CATOPOCHROTIDAE (1).
CRYPTOPHAGIDAE (2).
LATHRIDIIDAE.
- Myrmecophilous Lathridiides (30).
- Termitophilous Lathridiides (1),

CUCUJIDAE (7).
COLYDIIDAE (9).
NITIDULIDAE (5).
THORICTIDAE (40).
HISTERIDAE.
- Myrmecophilous and termitophilous Histerides together (128),
- Termitophilous Histerides alone (7).

SCARABAEIDAE.
- Myrmecophilous Scarabæides (17).
- Termitophilous Scarabæides (6).

ANTHICIDAE (1).
CLERIDAE and CANTHARIDAE (?)
ALLECULIDAE (2).
TENEBRIONIDAE (6).
CURCULIONIDAE.
- Myrmecophilous Curculionides (4).
- Termitophilous Curculionides (1).

BRENTHIDAE (1).
CERAMBYCIDAE (1).
CHRYSOMELIDAE.
- Myrmecophilous Chrysomelides (7).
- Termitophilous Chrysomelides (2?).

EROTYLIDAE (1?).
COCCINELLIDAE (2?).

STREPSIPTERA (1).

HYMENOPTERA.
(Myrmecophilous 39, Termitophilous 6.)
FORMICIDAE.
- Myrmecophilous Formicidae (22).
- Termitophilous Formicidae (6).

AMPULICIDI and CRABRONIDAE (1?).
PEZOMACHIDAE (2?).
BRACONIDAE, CHALCIDIIDAE, PROCTOTRUPIDAE (14).

LEPIDOPTERA.
Myrmecophilous Lepidoptera (26).
- Parasitical caterpillars (4).
- Honey-bearers (22).

Termitophilous Lepidoptera (2).

DIPTERA.
Myrmecophilous Diptera (18).
Termitophilous Diptera (2).

ORTHOPTERA.
Myrmecophilous Orthoptera (7).
Termitophilous Orthoptera (?).

NEUROPTERA (?).

PSEUDO-NEUROPTERA.
Myrmecophilous Pseudo-Neuroptera (1).
Termitophilous Pseudo-Neuroptera (4).

RHYNCHOTA.
(Myrmecophilous 72, Termitophilous 3.)
HETEROPTERA.
Myrmecophilous Heteroptera (39).
Termitophilous Heteroptera (1?).
HOMOPTERA.
Myrmecophilous Homoptera (15).
Termitophilous Homoptera(1).
PHYTOPTHIRES.
PSYLLIDAE (1).
APHIDAE (9).

COCCIDAE.
Myrmecophilous Coccides (8).
Termitophilous Coccides (1).

THYSANURA.
(Myrmecophilous 20.Termitophilous 1.)
PODURIDAE.
Myrmecophilous Podurides (8.)
Termitophilous Podurides (1).
LEPISMIDAE (12).

MYRIAPODA (?).

ARACHNOIDEA.
(Myrmecophilous 60, Termitophilous 4.)
Pseudo-Scorpionina and Scorpionina(?).

ARANEINA.
Myrmecophilous spiders (26).
Termitophilous spiders (3).

ACARINA.
Myrmecophilous Acarinids(34).
Termitophilous Acarinids (1?).

CRUSTACEA.
Isopoda (9).

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

Dr. Hamilton, writing from Brigantine Beach, New Jersey, in 1885, reports: "The multitudes of this butterfly that assembled here the first week in September is almost past belief. Millions is but feebly expressive. Miles of them is no exaggeration. On the island is a strip of ground from 150 yards to 400 yards wide, and about two and a half miles in length, overgrown with *Myrica cerifera* (bayberry). After three o'clock the butterflies, coming from all directions, began to settle on the bushes, and, by evening, every available twig was occupied. To see such multitudes at rest, all suspended from the lower sides of the limbs, side by side, as is their well known custom, was something well worth seeing. One evening, I travelled more than half the distance of their encampment, and learned that it extended the whole length and breadth of the bushes. In the morning they gradually separated, and did not appear unusually numerous during the day, but in the afternoon they came again as described. I found them on the 2nd, the day of my arrival, as related above, and this was repeated daily till the 6th, the forenoon of which was rather calm and sultry. A storm of wind and rain came on about 2 p.m., continuing until midnight. The next afternoon few came to camp, the great army had disappeared. But how? when? where? During the next few days they appeared again in considerable numbers, about as numerous as they had been observed in former Septembers, but insignificant when compared with those that preceded. The males and females were about equal in numbers. Not a single stalk of their food-plant (*Asclepias*) grows on the island."

On September 23rd, 1886, Dr. Ellzey reports (*Insect Life*, i., p.

221) that at West River, Maryland, about 7 o'clock in the morning, his attention was called to the fact that "the whole heavens were swarming with butterflies." There was "an innumerable number of them at all heights, from 100 feet to a height beyond the range of vision except by the aid of a glass. They were flying due south-west in the face of a stiff breeze. Observations upon the flight of individuals, between points of known distances apart, showed that the rate of movement was not far from twenty miles an hour. Where they originally came from or whither they went we could not tell. They undoubtedly came from beyond the bay, which, in that place, is fourteen miles across, and they must have been early on the wing. By 11.30 a.m. the numbers had declined, and it was evident that the bulk of the flight was over, but for several days a great many individuals, evidently following the migrating movement, were observed." Two days later (September 25th, 1886) a report from Maryland (Baltimore County) states that a vast multitude of the same butterflies were seen "in migratory movement." They were seemingly exhausted in flight, and settled on the trees in such multitudes as to give them the appearance of an autumnal frost. Andras reports that in September, 1887, about the heads of the Saskatchewan River, shrubs and small trees were covered with them in countless numbers. In the cool (almost frost) of the evening they could be shaken to the ground in a helpless, chilled condition, but were lively enough when the sun warmed them. He further adds that "the Cree and Blackfeet Indians say the wind from the south brings them there." Another report from Hampton (New Hampshire), by Scudder, states that, on September 2nd, 1888, when only a stone's throw from the water, continuous streams of *A. archippus* passed towards the south-west, following the line of the sea-coast, with the wind about north-west. It was calculated that some fifteen hundred passed the observer in a very short time. In 1892, a year in which this species appears to have been exceptionally abundant, in Ohio and Northern Indiana, the following report relating to the appearance of the insect was sent to *Insect Life*: "On September 19th, in the afternoon, a multitude of butterflies visited Cleveland on their way south. There were swarms upon swarms of them, and, for a while, they completely filled the air. They were of the large brown variety of the Milkweed butterfly, and it is supposed that they were started by the storms in the east. Such migrations, although not unusual in the south and west, are very uncommon in this part of the country." Dr. Neal also reports (*loc. cit.*, v., p. 197) that, on October 4th, 1892, he saw a swarming or migration of *A. archippus*, near Okhahoma, Texas, finding "hundreds of these butterflies roosting at 3 p.m. They were as thick as the leaves on the shrubs. At 9 a.m. next morning they took to the air, and, as far as one could see east and west, from 40 to 200 feet above the ground, the butterflies were flying to the south, apparently one every few feet; often a cloud of several hundreds would pass almost in a solid body, enough to cast a shadow. At 2 p.m. they diminished in numbers and flew lower down. From the best information that could be obtained this swarm extended twenty miles east and west, and were in motion steadily southward from 8 a.m. to 3 p.m. On October 6th, a smaller swarm was seen, from 10 a.m. until 3 p.m." The observer adds that "no one here recollected seeing such a migration before."

Commenting upon this report Riley says: "The swarming in the spring and fall of this large cosmopolitan butterfly has been frequently noticed and often discussed in entomological periodicals. It migrates to the north in the spring and to the south in the autumn. It seems to have been more than usually abundant this summer in this country, and, as a result, its migrations this autumn have been more frequently noticed than usual. We noticed, in the *Cleveland Plaindealer* of September 20th, a most interesting account of the passage of immense swarms over that city. The head lines of the article are so characteristic of American journalism that they will bear repeating:—'MANY MILLIONS. *Swarms of Butterflies Invaded Cleveland*, and Everybody Gazed at the Wonderful Sight—A Beautiful Vision of Orange Yellow—Strange Flight of the Insects from North to South—Mistaken for Cholera Germs—Immigrants Who Disregarded Mayor Rose's Proclamation.'"

One other observation may be added, that of Bowles, who states that he has himself seen the shores of Lake Ontario, near Brighton, strewn with hundreds of their dead bodies, cast up by the waves, and which no doubt had formed part of a swarm, which from weakness or some other cause had perished while flying across the Lake.

From these and similar observations it has been concluded that the swarming of this butterfly in autumn is analogous with that of birds before commencing their flight southward, and that, after swarming, the butterflies return to the subtropical lands whence their grandmothers and greatgrandmothers set out in spring. It is admitted that the climate is such, in the northern territories to which the species annually spreads, that the butterfly cannot possibly exist in the winter, and Riley, who first propounded the return theory, himself confesses that "under the most favourable conditions a large majority perishes." As we have said, Scudder accepts the theory as fact, and practically writes as if it were proved beyond question of dispute. For ourselves, although we know of no exact analogy among butterflies of a similar swarming habit, yet, in every other respect the similarity between the habits of this species and our own European migrating species, *Pyrameis cardui*, *Colias edusa*, &c., is so great, both as to the continuous-brooded habit, and also as to Dr. Thaxter's observation that the males and females in the autumnal swarms pair, that we are inclined to doubt the conclusion. It has never yet been shown that the journey has been successful. The swarms are sometimes noted as going in a different direction from that assumed by the theory, and much more evidence is necessary before even an approximation to success can be admitted. For ourselves, we doubt whether the return journey has ever been successfully made, and we consider that there is altogether insufficient direct evidence to warrant the assertion that the autumnal swarms of *Anosia archippus* migrate from the more northern parts of its summer range in America, to the south, in order to winter there. Some of the quotations which we have just reviewed, and others mentioned by Riley (*Third Ann. Rept. Insects of Missouri*) and Scudder (*Butterflies of New England*) show distinctly that the swarms do sometimes fly more or less from north to south, or from north-east to south-west; but the general opinion that one is compelled to form, after reading most of the notes relating to the autumnal swarming of this species is, that

the large congregations of butterflies that then collect will, given fine calm weather, stay long (in swarms) in one place, and the evidence is altogether insufficient to show that these go south-west rather than in all (or any) directions apart from weather conditions. Ellzey (*suprà*) states that the swarm he observed at West River, Maryland, on September 23rd, 1886, was "flying due south-west in the face of a stiff breeze," and Neal (*suprà*) that the movements observed in October, 1892, in Texas were to the south, whilst one of Riley's swarms, in April,* at Manhattan, Kansas, came rapidly "with a strong wind from the north-west." Moffat (*Can. Ent.*, xii., p. 37) notes the constituent elements of the swarms as dispersing by day, and coming up to the roosting-place from different directions towards night, which suggests that in favourable weather they remain in a fixed locality.

* Surely at this time of the year the flight should have been going to the north-west, not coming "from" the north-west.

ORTHOPTERA.

The distribution of Orthoptera found in Great Britain.

By MALCOLM BURR, F.Z.S., F.E.S.

The few following notes on the European distribution of the Orthoptera of our fauna may be of interest to the student of this order. When the relations of our few species to each other, and when their foreign distribution are considered, the list of our species has much greater significance and interest.

Forficula auricularia, L.—The common earwig is as abundant throughout Europe as it is in England. The var. *forcipata*, Stephs., does not appear to be at all rare. The species occurs also in Asia Minor, and in northern Africa, and in Madeira. It has been imported into North America, and does not appear to be a great rarity in the eastern States. Several other species uniting *auricularia* with the following are found in southern Europe.

Forficula lesnei, Fin.—Finot first described this species in 1888, when it was considered a great rarity. It was supposed for some time to be confined to northern and central France, but recent collecting has shown that it is common in the northern part of that country, and is local but widely distributed in England, especially in the southern counties. De Sélys does not include it in the list of Belgian species, and M. Lameere has informed me that it is unknown to him. It has been found also at Madrid and in Galicia.

Apterygida albipennis, Meg., is a characteristic central European form. I have taken it in numbers in the forest of Fontainebleau, and it is common in Switzerland, Austria, and central Europe generally. Its most northern points of distribution are Norfolk and Ashford, and its most southern is Granada. It is found also in the Riviera, and in Greece at Athens and Corfu.

Apterygida arachidis, Yers., is a cosmopolitan species, and even its original home is unknown. With us it only exists under artificial conditions.

Labidura riparia, Pall.—This is another cosmopolitan form, but is worthy of consideration as it is very likely indigenous in this country.

It seems to have been originally a Palæarctic species, and is to be found on river-banks, and among the shingle of the coast in southern France, also along the Mediterranean Sea, in Asia Minor and the Transcaucasus, and again in Korea. It is to be found also in nearly every port in the world, and in South America has developed some remarkable varieties. It varies considerably in size, colour and form, and most forms have been described as separate species.

Anisolabis maritima, Bon., is a species with similar habits to the last; it is also probably Palæarctic in origin, but is now cosmopolitan. Its occurrence in England is purely artificial. It was discovered in numbers nearly fifty years ago, near South Shields, among heaps of refuse consisting chiefly of ballast from ships returning from abroad. It is uncertain how long the species maintained its hold there, and whether it is still in existence there.

Anisolabis annulipes, Luc., is also cosmopolitan, and an introduced species with us. The genus *Anisolabis* is represented throughout the world.

Labia minor, L., is the typical species of a large genus with a world-wide distribution. *L. minor* is essentially Palæarctic, and is common throughout Europe. It occurs in North America, but is there an introduced form.

Ectobia lapponica, L., occurs throughout Europe from the Volga to Lapland. I have taken it in Wallachia, and in the mountains of Bosnia and Hercegovina. In Lapland it destroys the dried fish of the natives. With us it is local but not rare. It is not a native of southern Europe proper except in the mountains. It has been taken on Mount Etna.

Ectobia panzeri, Stephs., is common in Belgium, Holland, France and the south of England. It is rare in Germany and has been taken sparingly in Dalmatia and Ferrol.

Ectobia livida, Fabr. The distribution of this species is similar to that of *E. lapponica*, but more southern. In the north it is rare, but occurs in Germany. It is common throughout central Europe, and abundant in the south.

The genus *Ectobia* contains about half a dozen species: those which do not occur with us are essentially southern in distribution. A closely allied genus, *Aphlebia*, contains many more species and is more widely distributed. It is not yet known to be represented in this country, though some of the commoner forms might turn up (*e.g.*, *A. maculata*, northern France, Belgium, Switzerland, or *A. punctata* with a similar distribution). No other cockroaches are indigenous in this country.

Mecostethus grossus, L., is the only species of the genus. It is more or less common in the marshes throughout the whole of northern Europe, as far as Lapland.

Stenobothrus is a large genus, containing about fifty species, distributed throughout the the Palæarctic region. No true species of the genus occurs outside its boundaries, though extremely closely allied forms occur in North America. Brunner divides the genus into five groups or subgenera, of which four are found in Britain. Though it may be sometimes considered hard to distinguish our species, it is far more difficult to discriminate the European forms, which are so numerous, and which come between our familiar species in the system.

Of the first section (*Stenobothrus, sensu strictiore*, Bol.), we have only *S. lineatus*, Panz. With us it is more or less local, but it is found throughout Europe, except in the extreme north. The other members of this section are purely southern.

Of the second section (*Omocestus*, Bol.), we have no representative.

Of the third section (which together with section 4 = *Stauroderus*, Bol.), we have two closely allied forms, *S. viridulus*, L., found throughout northern and central Europe, and *S. rufipes*, Zett., with a similar distribution, but rarer in the north, and not penetrating so high in the mountains as the former. Very closely allied to the latter is *S. haemorrhoidalis*, Charp., which is found in central Europe. It may possibly occur also in our southern counties.

Section 5 of Brunner, included by Bolivar in the same subgenus as the last species, includes *S. bicolor* and *S. biguttulus*. Of these the former is perhaps our commonest species, while the latter remains to be discovered. *S. bicolor* is equally common throughout Europe, but *S. biguttulus* less so; it is to be found, however, from Scandinavia to the Alps, and might well be a native of this country. This subgenus *Stauroderus* contains a large number of species, occurring chiefly in the south and east of Europe, which are not known in Great Britain.

The last part of section 5 (*Chorthippus*, Fieb., Bolivar) contains at least two British species. *S. parallelus*, Zett., occurs throughout Europe from Norway to Greece, and is perhaps in Britain our commonest grasshopper. Its near ally, *S. longicornis*, is found in central France, and should be looked for in our southern counties also. *S. elegans* is very local with us, though abundant where it does occur: on the continent it is widely distributed, but does not seem to be common. It has been recorded as occurring in Belgium, Berlin, Sweden, Austria, and in the south, Istria, Croatia, Hungary, Transsylvania, Servia, Moldavia, and Bosnia. A closely allied species with a wider distribution is *S. dorsatus*, Zett., which would be more naturally expected to be a native of England than *S. elegans;* it is common in most places throughout northern and eastern Europe. Another member of the same group is *S. pulvinatus*, Fisch. de W., which has been found in Jersey and in the north of central France. The small genus *Gomphocerus* is represented by *G. rufus* and *G. maculatus*, both being common in north and central Europe.

No species of *Oedipodidae*, *Acrididae*, *Pamphagidae* and *Pyrgomorphidae* are found in England, though all are more or less well represented in Europe. Of the large family *Tettigidae*, we have but two known in Britain, both of which are widely distributed in Europe; another species *T. fuliginosus* is known from Sweden and Lapland, and should be sought for in Scotland.

The largest family of the *Locustodea* is the *Phaneropteridae*, of which there are two distinct types, the apterous and the winged forms. In Britain we have only the common wingless *Leptophyes punctatissima*, Bosc., but it is quite conceivable that some forms of *Barbitistes* or *Orphania* may some day turn up in our hills and forests.

The *Meconemidae* are a restricted family, and we are not likely to have anything more than the common *M. varium*, which is widely distributed in central Europe.

The genus *Platycleis* contains a large number of species, some with very restricted distribution. Our three species are well spread over

Europe, but one other *P. bicolor*, Phil., a native of central Europe, might yet turn up. *P. grisea* is common throughout Europe; *P. brachyptera* is common in northern and central Europe, but does not occur in the south; *P. roeselii* has a similar distribution, but is rarer in the north, and is further spread in the south; Brunner gives Croatia, Istria, Mehadia and Servia, and I have taken it in Bosnia, as far as I know, the most southerly point of its occurrence.

Thamnotrizon includes about twenty species, most of which are confined to the southern and eastern parts of the continent, but *T. cinereus* is common throughout northern and central Europe.

Decticus verrucivorus, L., is even commoner and more widely distributed than the last species, and it is surprising that it is so rare in Britain, it is numerous in Sweden in the north, and in the south I have taken it abundantly in the plains of Wallachia. The other two species of the genus are essentially meridional.

Locusta viridissima, L., is common from Sweden to Sicily: I have taken it in numbers near Stockholm, and again in the south. An allied species, *L. cantans*, occurs in the mountains of central Europe, and might possibly be taken in our hills. *L. caudata* is even a finer species than *L. viridissima*, but is rarer and is found only in the south and east of Europe.

Xiphidium is a very large genus, found throughout the world in temperate and tropical zones. The commonest European species is *X. fuscum*, which strangely enough is not known in this country. I have taken it in Germany and in Dalmatia, but it is not found in Scandinavia nor in Belgium. *X. dorsale* is a much rarer species, but is commoner in the north than *X. fuscum*, and occurs in Sweden and Belgium, where the other is unknown.

Nemobius sylvestris, Fab., is with us confined to the New Forest, but it is abundant in all woods in central Europe. Why it has not been discovered in other parts of England is a mystery, and there is no reason why it should not be found in many other localities. The other three European species of the genus are southern.

Gryllus campestris, L., is found throughout Europe except in the extreme north; with us it is distinctly local, but occurs in a few sandy places. In the "Hope collection" at Oxford, there is a specimen with fully developed wings, which may be a variety of this species or the allied *bimaculatus*, which is unlikely, as the latter is purely a southern form. It may be distinguished from *G. campestris* by having the head not broader than the pronotum. The long-winged variety of *G. campestris* is a rare form, and should be carefully sought.

Gryllotalpa is a genus which is also very widely distributed throughout the world. Our species is common in all Europe, and in some places is even a nuisance. The variety with short wings (*G. cophta*, de Haan), should be carefully looked for.

On a few Orthoptera from Suffolk.—Mr. Claude Morley has been so kind as to send me a few Orthoptera from Suffolk. There is nothing very rare among them, except *Stenobothrus elegans*, Charp., which is a very locally distributed species. My only justification in writing the following note lies in the fact that few if any Orthoptera have been recorded from Suffolk, so that the chief interest lies in the localities. *Stenobothrus viridulus*, L., Barnby Broad, August 11th, 1898, ♂ and

♀. Lowestoft district, August 21st, 1898, ♂. This is a common species, occurring in open grassy places throughout the country. *Stenobothrus rufipes*, Zett. There is a pair of this species, unfortunately without localities attached; it is less common and widely distributed than its near ally, the above. *Stenobothrus bicolor*, Charp. This is perhaps our most abundant grasshopper. Mr. Morley sends a number of examples from the Ipswich district, from Felixstowe, October 31st, 1899, and Foxhall Heath, September, 1899, numerous examples, including the green form *mollis*, Latr., and the red form *purpurascens*, Charp. There is a very immature specimen from Felixstowe links, taken as early as June 4th, 1895, and from Icklingham Plains, June 12th, 1899. *Stenobothrus elegans*, Charp. One female from the Lowestoft district, August 9th, 1898. This is a very local species, found in but a few districts, though where it does occur it is usually extremely abundant. *Stenobothrus parallelus*, Zett. Ipswich, September 10th, 1897, and Bramford, July 31st, 1896. One of our commonest species. *Gomphocerus maculatus*, Thunb. Ipswich district, Foxhall Heath, August 15th, 1897; Lowestoft district, July 12th, 1895. *Tettix subulatus*, L. Ipswich district, June 12th, 1900. *Thamnotrizon cinereus*, L. This is the only Locustid in the collection. It is extremely immature, and chiefly interesting on account of the early date of its capture. No locality is attached, but the date is May 10th, 1900. At this period the majority of our Orthoptera are being just hatched out, though but few appear before the later half of the month. May 10th is the earliest record in my knowledge of the capture of this species.—M. Burr.

COLEOPTERA.

Eggs of Clythra quadripunctata.—[I received from Mr. Tutt nine or ten eggs, with a request for a "good description" of them, and with them a note from Mr. Donisthorpe to Mr. Tutt, asking him to do what he could with them. I have no further information about them except that they are *Clythra*.] Half a dozen of the eggs are naked, long ovoid, apparently circular in cross section. The length is 12mm., the greatest width ·56mm. The colour is a yellowish-white, somewhat opalescent, with clearer and more transparent contents towards the ends in some specimens. Two specimens possess a curious coating or capsule, and one other has a shred of similar material attached. When magnified so as to look an inch or two long, one cannot resist the idea that here is a larval case, or cocoon, clothed with the brown glumes or bracts that fall from the leaf-buds of trees when they open in spring. A full third of the egg protrudes from the case, the margin where the egg protrudes lies closer to the egg than do the projecting bract-like bodies forming the rest of the case, and looks as if it consisted of six or seven such bodies applied rather closer to the egg, or as though the top of the egg had been covered by a continuous membrane, and had escaped, so far as it had, by this slitting open into six or seven flaps. The "bracts" are thin and membranous, projecting in various directions, rather away from the open end of the case, but unlike bracts are not all to regular pattern, and are like irregular torn pieces of membrane of various sizes and shapes. Their total projection is ·12mm. from the surface of the egg.

They appear to be of greater area than could be accounted for by supposing they represented the shrivelling of a continuous coat of the egg, resulting from the egg protruding through a rupture at the end. But that this case or capsule has some such origin looks very probable. This is, therefore, an egg that has a cocoon from which it emerges. A later investigation, after moistening the eggs, shows that the case is really a capsule from which the egg is escaping, the bract-like processes are double, that is, are folds of the retreating egg-covering. The summits of these folds are curved, with the concavity towards the open end of the case, and in one place two rows of these folds, consisting of three in front of each other in each row, form a very regular pattern, each member of which is very like a bract, say of oak, in form. I shall be much interested to hear from Mr. Donisthorpe how this cocoon is provided for the egg, and what is probably its use.—T. A. Chapman, M.D., F.Z.S., Betula, Reigate. *June 23rd*, 1900.

Further note on Clythra: the newly-hatched larva.—*June 28th*. Two of the larvæ mentioned in the above note have emerged, one from a naked egg, one from one of the clothed ones. The clothed egg has a larva that looks very much as if the clothing were to form the first larval case, the head and legs protruding from the egg, of which a portion is still visible just beyond the margin of the clothing. This is either really so, or I have happened just to catch it as it was emerging. Two more eggs show the larva very plainly within the transparent shell, the others are unchanged. The larva is very like a miniature cockchafer grub, in having the abdominal segments acutely bent forwards. The head is large, the antennæ short and stumpy, of two joints, the first so thick and the second so square at the end as to look like the two basal joints of a lepidopterous antenna with the remainder broken off. The mouth-parts are well seen. The legs are very long, more than half the length of the body; the coxæ, femora, and tibiæ being very long; the tarsi are represented by a good claw only, which is, however, not a claw, but a joint, as it carries a hair or two. —Ibid.

Leptinus testaceus near Faversham.—Coleoptera in the Blean Woods.—On May 12th last I had the good fortune, while looking in the mouth of a rabbit burrow in a wood, on the chance of obtaining *Aleochara cuniculorum*, Kr., to come across a stray *Leptinus testaceus*. Further search revealed a mouse hole and run. Adjacent to and in and about the leaves at the top of the run, Mr. Donisthorpe and myself were able each to take a nice little series of this interesting beetle. The spot which has since been overgrown by herbage is not more than a quarter of a mile from my house. I hope to be able to look it up again in the autumn. Mr. Donisthorpe was with me with a view to a visit to the Blean Woods, but these have not been very good this year. May 13th was apparently too late for myrmecophilous beetles, only the commoner Staphs being obtainable, and a second visit paid by myself in June produced hardly anything worthy of notice, except *Gonioctena rufipes*, Gyll., and *Nemadus lucina*. The whole place was then overrun with *Formica rufa*, and along the tracks nests occurred every few yards. They swarmed on the bushes and trees, and it is a wonder that anything not myrmecophilous should be able to exist with them. Even specimens of *Balaninus villosus*, Hbst., taken by

me, showed traces of their attacks, antennæ and legs being sadly deficient.—A. J. Chitty, M.A., F.E.S., Huntingfield, Faversham, Kent.

SCIENTIFIC NOTES.

The generic name Siona, Dup.—The necessity of a thorough historical revision of the generic names used for the Heterocera, after the method followed by Scudder for the butterflies, is patent to everyone who commences to look into the question, and if I have only within the last twelvemonth become awakened to that necessity, this is simply because I had not earlier examined our literature from this point of view. To illustrate the nature of the slip-shod work which has been allowed to find acceptance in our nomenclature (though indefensible under any conceivable code of rules) I may take the case of the generic name *Siona*, proposed by Duponchel in 1829-30, for a mixed genus, but with *specified* type *dealbata* [*lineata*, Scop., Stgr., Cat.]. Stephens, in 1831 (*Ill. Haust.*, iii., 244) very properly accepts the name for *dealbata*, in place of the preoccupied *Idaea*, Tr. (Stph. restr.), which he used in 1829, but by an unfortunate typographical error he gives it as *Scoria*, and, although he corrects this to *Siona* in the same volume (p. 328) and in his *List Anim. Brit. Mus.*, p. 210 (1850), and Curtis, in 1838, repeats the type citation of *dealbata* for *Siona*, yet later authors manage to ignore this, perpetuate the erroneous *Scoria* for *dealbata*, and make quite a new restriction for *Siona*, Dup., namely to *nubilata* and *decussata*! Needless to say, the name *Scoria* must be dropped, as indeed it was dropped by its inadvertent author nearly 70 years ago, and we must write *Siona lineata* (=*dealbata*); while for *Siona*, Stgr., Cat. (*nec* Dup.) we must substitute *Schistostege*, Hb.—L. B. Prout, 249, Richmond Road, N.E.

Copulation of Hepialus hectus.—On the evening of June 27th I saw a female *Hepialus hectus* seated on the underside of a hornbeam leaf. Two males were observed flying around her for some time, when at last one of them copulated with her, immediately hanging head downwards without any of its legs attached to the leaf.—F. M. B. Carr, Terminus Hotel, Hailsham, Sussex. *June* 28th, 1900.

Cross-pairing of Smerinthid species.—The following are a few notes on an experiment I have been trying with the hawk-moths, the following of which I have paired:

(1) Male *Smerinthus ocellatus* with female *S. populi*.
(2) Female *S. ocellatus* with male *S. populi*.
(3) Male *S. ocellatus* with female *S. tiliae*.

(1) On May 28th I bred one male and one female *Smerinthus ocellatus*. They were about to pair, when I took the female away and placed a female *S. populi* in its place, the male *S. ocellatus* flew round the cage and paired immediately. They were together 48 hours, after which *S. populi* commenced laying, and in six days had deposited about 90 eggs. On June 10th I noticed several eggs had become depressed and sunk in on the surface so that they were evidently infertile, the other ova of this batch remain as they were laid. The ova are bright apple-green and oval in outline. (2) On June 3rd I bred a female and a male *Smerinthus ocellatus*. When about to pair, I removed the male *S. ocellatus*, and placed a male *S. populi* (recently bred) in the cage with the ♀ *S. ocellatus*; they paired almost immediately, but were only

together about an hour, after which *S. ocellatus* started laying, and in five days laid 56 eggs. These eggs are different in colour and shape from those laid by *S. populi*, being a light pale green tinged with pinkish and more elongated. On June 14th some of the ova were slightly depressed. (3) On May 29th I bred a male *Smerinthus ocellatus*: it began to fly about (as if in search for a mate) so I placed a female *S. tiliae* (bred the same afternoon) with it and both flew about the cage furiously, but the *S. ocellatus* darted at once on the *S. tiliae* and they were paired for half an hour when *S. tiliae* began struggling and they parted. I left them in the cage for five days, but still the ♀ *S. tiliae* laid no eggs. I then killed the *S. ocellatus*, and later, on the same evening, the ♀ *S. tiliae* laid one egg. From June 3rd till June 14th eight eggs were laid, all on the underside of lime leaves. I hope these will hatch, especially as I have never heard of these two species pairing before. I will report later as to the results.—C. P. Pickett, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *June 14th*, 1900.

Habits of certain Erebias.—We have already described (*Proc. Sth. Lond. Ent. Soc.*, 1898, pp. 64-5) the great difference that exists in the habits of the sexes of *Erebia nerine*. This would appear to be pretty general among many Erebiid species. On August 3rd, 1899, a walk up the road from Simplon to the first refuge showed a number of males of *Erebia manstra* settling on the bare road, and with them swarms of *Erebia goante*, *E. pitho* and *E. tyndarus*. Not a single female *E. manstra* came to the road that we could discover, and the females of the three commoner species named, also insisted on keeping to the flowers of the slopes and roadsides, and rarely followed the habits of the other sex. The males will often sit three or four (or more) in a little heap, heads together, reminding one much of the gregarious habits of those of *E. nerine* on the rocks of the Mendelstrasse. Dr. Chapman observed a pairing between the sexes of *E. goante*. The male was seen to walk up to the female two or three times, without appearing to make much progress, when suddenly and without any apparent further courtship the insects suddenly paired. If *E. goante* be disturbed when paired, the male always appears most anxious to get away, and hurries off as rapidly as possible, carrying the female.—J. W. Tutt.

Moths attracted by, and drowned in, the drainings from a manure heap.—On August 2nd, 1899, Dr. Chapman and myself took a walk to the pastures stretching to the right hand, about a mile or two from the village of Simplon, going towards the summit of the pass. These slopes form a remarkably good collecting ground, and on this particular day we saw *Colias phicomone* and *C. hyale* haunting the same ground. The abundance of *Syrichthus alveus* here is almost incredible, the ♀s distinctly sprinkled with yellow, and the males flying early in search of the newly emerged ♀s, which hide among the grass, whilst *Polyommatus corydon* is nearly as abundant. *Brenthis pales* is common, this species extending quite down to the village. The common Erebias are *melampus*, *tyndarus*, *pitho* and *goante*, whilst *E. eurgale* is comparatively rare. I may here note that of three females of this latter species captured, not one was like the others, and one of them, although evidently a female, presents none of the characters of the underside that distinguish the latter sex, but is exactly similar in this

respect to the males. But the purpose of this note is to state that, as we were returning, we came across a little pool about a yard across and a foot or so deep, filled with the drainage from a manure heap. On such pools it is a common experience to see a dozen or more dead moths floating, but on the surface of this pool there was such a mass of dead lepidoptera as we had never before seen. Dr. Chapman thought 2000 a very moderate estimate, and they appeared to consist largely of *Cidaria immanata*, *C. populata*, *Larentia caesiata*, *L. verberata*, *Cidaria pyraliata*, *Boarmia repandata*, *Erebia tyndarus* and *E. goante*. There were of course odd examples of many other species, but those named constituted the bulk of the victims. We noticed as we were examining the pool, two or three examples of *Erebia goante* and *Polyommatus corydon* settle on the surface, and it was clear that they rose with difficulty, especially the specimens of *E. goante*. This was apparently due to the stickiness of the surface, which clogged the scales, and so prevented the insects from rising again. Once thoroughly soaked, they appeared to sink a considerable distance below the surface into the viscous mass. We have seen small numbers in tan-pits, in the water surrounding gas-tanks, and similar places in England, and in the Cogne valley we once observed large numbers of moths, principally *Larentia caesiata* and *Cidaria populata*, drowned in the roadside puddles that had been formed by a heavy storm. These and many similar observations we have already recorded in our paper on "The drinking habits of butterflies and moths," but such a number of drowned insects, that had evidently fallen victims to their appetites, we had never before seen in such a limited space.—Ed.

NOTES ON COLLECTING, Etc.

Smerinthus ocellatus two years in the pupal stage.—On June 10th I bred a fine female of this species which had lain in pupa for two years. The larva was taken at Brimsdown in 1898, and the pupa when discovered to be likely to lie over was carefully isolated. The imago has a slight tendency towards melanism, but is otherwise typical. The pupa has been kept in a cage which has not been damped for the past eighteen months, and the earth itself is very hard.—E. W. Lane, 9, Teesdale Street, Hackney Road, London, N.E.

The Food-plants of Oxyptilus distans.—I have just come across a note written some time since by Mr. F. Norgate, who bred this species from pupæ, which he found in the flower-heads of what he now believes to be *Crepis virens*, but which he thought at the time was *Hieracium umbellatum*. One would suspect that Mr. Norgate, or some other of our East Anglian lepidopterists, could give us a life-history of this insect without much trouble. It is surprising that the life-history of a species that has been freely captured for many years, by several lepidopterists, should so far have escaped us. The life-history of *Oxyptilus parvidactylus* is practically blank, at least no British lepidopterist has given us an account of it, and the life-histories of *Aciptilia tetradactyla*, and *A. baliodactyla* are also wanting in many particulars, although they are among our commonest species.—J. W. Tutt.

Psychides in 1900: a Correction.—I find my "*Solenobia* sp." (*anteà*, p. 146) is *Narycia monilifera* (*Nysmatodoma melanella*); the

first example, a ♂, emerged yesterday, from one of the Epping Forest cases. As neither Dr. Chapman nor Mr. Bacot would venture to pronounce upon the cases, I do not feel ashamed of my ignorance of them, except in so far as I suppose I ought to have examined their occupants critically, and that the time of year at which I was taking them ought to have made me suspicious. On a visit to Epping Forest in company with Dr. Chapman, on May 26th, we found 39 of these cases, and the larvæ were at that time on the point of spinning up. My companion suggested to me on that occasion that they might perhaps prove to be *Narycia*, as they seemed rather too scattered for a species possessing a wingless ♀. I may add that since writing my last note I have found cases identical with these on pine trunks, at Westerham and Oxshott; a ♀ *N. monilifera* emerged from one of the latter yesterday.—Louis B. Prout, F.E.S. *June 22nd*, 1900.

Cymatophora ocularis in Kent.—I have the pleasure to report the capture of a female *C. ocularis*, drying her wings on the trunk of a Lombardy poplar, at 6.45 p.m., on June 20th, 1900, in this district.—L. W. Newman, Salisbury Road, Bexley, Kent.

Assembling of Arctia villica.—*Arctia villica* is by no means an abundant species in this neighbourhood, but by diligent search this spring I discovered as many as five larvæ. One of these emerged in a glass-fronted cardboard necktie box, in the north-west corner of my study, on June 17th. I noticed the imago during that afternoon, but forgot to kill it before dark. After sitting out in the garden until half-past nine I happened to come into the room, quite oblivious of the "cream-spot's" presence, when I heard two large insects, which I thought for the moment must have been hawks, buzzing about in great excitement on the upper part of a window facing south, the lower part of which was open. They proved to be males of *A. villica*. I now lighted my lamp and placed it on the table near this south window (still leaving the female *A. villica* confined in the box of her birth, in the north-west corner), but as an experiment I also opened the window facing due west, and awaited eventualities. At 9.45 a third male *A. villica* arrived, and entering the room by the lower sash of the south window was promptly captured by me and cyanided. At 9.55 a fourth suitor arrived and met with similar treatment. After this no more came, although I watched till 10.45. There seems to me little doubt that all these four males came up against the wind.—Rev. G. H. Raynor, M.A., Hazeleigh Rectory, Maldon, Essex. *June 22nd*, 1900.

Colias edusa in the Isle of Man.—On June 21st, about 11 a.m., I saw a number of *Colias edusa* flying about in a grass field close to the railway station, at Peel Road. This insect is looked upon as rare here, a few odd specimens only turning up from time to time. I have taken it occasionally at Laxey, Castletown, and Sulby. Is this looked upon as an *edusa* year?—H. Shortridge Clarke, F.E.S., Sulby Parsonage, Isle of Man. *June 23rd*, 1900. [Mr. Eaton records half a dozen of *C. edusa* (both sexes) near Branscombe, on June 12th, in fine condition. He also noted *Pyrameis cardui* at the same time and place. Mr. Prout saw both species at Chattenden on June 11th.—Ed.]

Rearing Sesia philanthiformis.—I have recently bred a number of *Sesia philanthiformis* (*musciformis*) from thrift, gathered from the rocks during May, and as I have been somewhat successful I venture to give briefly the means resorted to, which may prove useful to those

breeding the species. Having procured the small withered tufts of thrift, which either contained full-fed larvæ or pupæ, I placed them in a large glass receptacle securely fastened, on a shelf in a cool greenhouse, and took care that they should have plenty of sunshine; I also sprinkled a little water over the thrift each morning. In former years when trying on several occasions to obtain imagines from pupæ, I have invariably failed owing, I believe, to my having kept them too dry, and having placed the box containing them too much in the shade. Sunshine and moisture are, in my opinion, most essential in breeding the species from pupæ.—Ibid.

Stauropus fagi at Dormans Park.—On June 18th I caught a fine male example of *Stauropus fagi* in my bed-room at 11 p.m. I noticed it flying, then it suddenly disappeared, I eventually found it sitting on my chest, when I promptly bottled it. The species was quite new to me, and I believe is new to the district.—M. Burr, F.Z.S., F.E.S., Dormans Park, East Grinstead. *June 19th*, 1900.

Habits of the larva of Eutricha quercifolia.—I have for many years taken *E. quercifolia* in the larval stage in early spring. To find the wild larvæ, I search early in April low down on the stems of blackthorn. They are always on the young wood, and where a hedge has been cut down, or on a bank where there are young suckers among grass, one usually meets with success. The most unlikely-looking places are generally the best. In Kent it appears to be widely distributed, I have taken larvæ this spring in six different places. I have occasionally found it on apple, once on dogwood, but the most common food-plant in nature is the blackthorn. The larvæ keep very low down during the day, feeding at night, and, in captivity, I water the food daily, the larvæ appear not to keep healthy otherwise.—L. W. Newman, 7, Salisbury Road, Bexley, Kent. *June 21st*, 1900.

Lepidoptera at Guildford.—Another visit to the Guildford district on June 16th turned out rather badly, the weather being unsatisfactory, *Cyaniris argiolus* and *Callophrys rubi* were still out, *Polyommatus icarus* and *P. astrarche* were frequent, and some nice splashed examples of the former were taken. *Nemeobius lucina* was over, only one example seen. *Brenthis selene* was not yet out, and only one *B. euphrosyne* was seen, but we observed *Pararge egeria*, *P. megaera* and *Eugonia polychloros*, whilst *Euchelia jacobaeae* were swarming. *Macroglossa fuciformis* was in good condition, and several other interesting insects captured, although certainly not in the numbers that they evidently would have occurred with more favourable weather —C. P. Pickett, The Ravenscrofts, Columbia Road, Hackney Road, N.E. *June 19th*, 1900.

Colias hyale at Tuddenham.—The most interesting recent capture is that of *Colias hyale*, in absolutely perfect condition, at Tuddenham, on June 13th.—W. J. Kaye, F.E.S., Worcester Court, Worcester Park, Surrey. *June 23rd*, 1900.

Cleora viduaria in New Forest.—I have myself recently examined a worn specimen of *Cleora viduaria*, taken by George Gulliver, at the beginning of July, 1898, in the New Forest.—Ibid.

PRACTICAL HINTS.

Field Work for August and the autumn months.

By J. W. TUTT, F.E.S.

1.—In late July and August the imagines of *Eremobia ochroleuca* are to be found seated in the middle of a flower of *Centaurea scabiosa* in the afternoon.

2.—The larva of *Hecatera dysodea* is to be found stretched at full length over the blossoms and seed-heads of the garden lettuce during August.

3.—Larvæ of *Ptilophora plumigera* buried in a dry sandy soil, after three weeks the pupæ were removed and laid on a perfectly dry surface, with a little moss thrown over them: they were subject to a high temperature during the latter part of summer and autumn, without any moisture whatever, yet all emerged well (Gascoyne).

4.—The full-grown larvæ of *Botys terrealis* live in July on *Solidago virgaurea*, they eat the flowers, often strip the entire spike, spinning a slight web among the flowers, out of which they wriggle when disturbed (Newman).

5.—In July and early August the little *Coenobia rufa* (*dispecta*) flies rapidly through the low herbage in damp places when quite dusk.

6.—For collecting, the wind should be south or south-west, dark, light rain, slight breeze, and the result will be good, but if one point to east or north no good; north-west if any wind, no good, if calm a little may be done; south or west, still and warm are breeding nights, sugar little or no good; north or east, with a light wind, little good, with a strong wind, no good. No time is good just before rain, but sultry weather just before a thunder storm is good, but not after, in general entomologise after rain and not before (Harding).

7.—On the sea coast, beneath the plants of *Atriplex littoralis* and *Salsola kali*, the larvæ of *Agrotis ripae* may be obtained in large numbers, resting when young on the stems and leaves of the food-plant, but afterwards tunnelling under the sand, where they hide during the day. They are best obtained from the middle to the end of August, when they are nearly full grown, and can generally be found simply by passing the fingers through the sand.

8.—The larvæ of *Coniodoma limoniella* are to be swept from flowers of *Statice limonium* in September, when they use an empty flower for a case. When full-fed they bore into the stem, dropping the flower, and close the hole with silk. The larvæ hybernate in the boring, and in May the old stems of *S. limonium* should be collected for them; they pupate in June and the imagines emerge in July (Fletcher).

9.—In early August search the *Stachys* in woods and by hedges for larvæ of *Amblyptilia cosmodactyla* and *A. acanthodactyla*.

10.—Towards the end of August the larvæ of *Cucullia asteris* are frequently very abundant on sea starwort.

11.—Towards the end of August the imagines of *Agrotis agathina* fly for about three-quarters of an hour at dusk, and can then be netted by the aid of a lantern. They do not fly fast and are very quiet in the net.

12.—A ♀ of *Camptogramma fluviata* taken in August or September should be kept for eggs. The larvæ feed up well on knot-grass and dock, and will emerge in November.

13.—Towards the middle and end of September, when the ordinary autumnal sugaring is generally considered finished, *Epunda lutulenta*, *Aporophyla australis*, and other local species often occur freely in coast districts.

14.—Through September the larvæ of *Heterogenea cruciata* (*asella*) should be searched for on beech in the New Forest, &c.

N.B.—Hundreds of similar "Practical Hints" for each month of the year are to be found in the preceding volumes.

Restoration of Green Colour in Lepidoptera.—It may interest some of those lepidopterists who are fond of trying experiments for the improvement of their specimens, to learn that Herr G. Lippe, in the "Mitteilungen des Mülhauser Entomologen-Vereins" for March, 1898, recommends the fumes of muriatic acid for the restoration of the colour of faded green lepidoptera, and states that he has repeatedly found it successful with *Hylophila prasinana*, *H. bicolorana*, *Jaspidea celsia*, and especially with Geometers. If this really restores a perfectly natural green, it will certainly be a boon to collectors; I have just spoiled a couple of beautiful *H. prasinana* by leaving them too long in a rather damp cyanide bottle.—Louis B. Prout.

CURRENT NOTES.

We have recently received from M. de Bormans, a new paper on *Forficularia*, entitled "Quelques Dermaptères du Musée Civique de Gênes" from the *Ann. Mus. Civ. Gen.*, (2), xx., (xl.), April 18th, 1900, pp. 441-467. Two new species of *Forcipula* are described, of which one is from Bolivia, the first of the genus known from the New World. A new and very distinct *Labidura* is described under the name *L. tenuicornis*, and two new *Psalis*, one from the Old and one from the New World. The curious genus *Gonolabis* is enriched by two new forms, one from the Caledon river, in South Africa, and the other from Sumatra. We observe that de Bormans restores the spelling *Spongiphora*, for the more usual *Spongophora*. A number of other new species are described, including three *Chelisoches*. One of these, *C. doriae*, was confused by the author with *C. superbus*, Dohrn (*Ann. Soc. Ent. Belg.*, 1883, p. 373), a mistake which he now corrects. A remarkable new *Mecomera* from Mentawei, in Sumatra, is also included. A valuable feature of the paper is that dichotomic tables are established for the genera *Forcipula* and *Gonolabis*: this is the first time that this has been done for any one entire genus of this group, and greatly simplifies their study.

The first number of the "Occasional Memoirs of the Chicago Entomological Society" (vol. i., no. 1. March, 1900), includes a paper by J. L. Hancock, in which he describes six new species of *Tettigidae* from Madagascar, establishing five new genera, to which he gives the names *Tetticerus*, *Notocerus*, *Hybotettix*, *Oxynotus* and *Cryptotettix*. The article is based on 39 specimens, captured by Mocquerys in the Bay of Antongil, in northern Madagascar. Other articles in the volume are "A new species of *Gomphus*," by J. Tough (*G. cornutus*, Illinois), and an interesting paper by J. G. Needham, on the "Insect drift on the shore of Lake Michigan," illustrated by photographs. His estimate

is tabulated, and gives a surprising result. Of Orthoptera of all sub-orders, quantities drifted to the shore, mostly alive. All the *Tettigidae*, well known for their swimming powers, escaped; of the *Locustodea*, none survived, but of *Gryllodea* and *Acridiodea*, half only were killed. Many dragonflies drifted along, and none survived. Of a number of *Coccinellidae*, *Scarabaeidae*, *Chrysomelidae* and *Carabidae*, a good many were dead, but of the survivors, only five per cent. were killed. Of the Diptera, *Bombylidae* and *Muscidae* were all drowned, but of the *Asilidae*, sixty per cent. escaped. All Hymenoptera reached the shore already dead. In Hemiptera, all the *Pentatomidae* were dead before approaching the shore, but of the *Belostomatidae*, themselves aquatic, ten per cent. were killed, mostly by accident, as the majority were more or less injured. Of a quantity of caddis-flies, apparently of the genus *Glossosoma*, which approached the shore mostly alive, ten per cent. were killed. The volume is concluded by an article on "The Argynnids of North America," by A. J. Snyder.

The Rev. F. D. Morice (*Ent. Mo. Mag.*, July, 1900) advises entomologists when collecting Hymenoptera to "abandon cyanide and use only pure sulphuric ether without alcohol." He says: "Hymenoptera so killed, not only preserve absolutely their natural colours, even those delicate yellows which cyanide and ammonia almost always turn to brown or red, but die in natural positions—not cramped and distorted like the victims of the other methods—and are, even so obliging usually as to open their mandibles and extend the whole cibarial apparatus so that it can be examined without any preparation of the specimen. These advantages and the perfect cleanness of specimens killed by ether seem to me much more than enough to repay the slight extra trouble and expense involved in using it. The one objection to ether is its rapid evaporation, but this can be met by carrying a small phial in the waistcoat pocket, from which a few fresh drops can be supplied to the collecting-bottle from time to time as required, and this should always be done as a *coup-de-grace* to finish off any possible survivors in the bottle when one returns from an expedition. Then if the bottle be kept well-corked and unopened for an hour or so the result is almost sure to be satisfactory."

At the meeting of the Entom. Soc. of London, held on June 6th, 1900, Sir G. F. Hampson exhibited specimens of a moth belonging to the subfamily *Hydrocampinae* of the *Pyralidae*—*Oligostima araealis*, Hampson, from Ceylon—where his correspondent, Mr. J. Pole, had met with a swarm on an island in a river which he estimated at 20,000. When disturbed the buzz made by their wings was quite audible, and after three waves of the net 236 specimens were bottled from round its edges, the net still appearing quite full; as in the 30 specimens sent the sexes were in almost even proportions, this was not a case of male assemblage. He also exhibited denuded wings, showing the neuration of *Diacrisia russula*, *Tyria jacobaeae*, *Callimorpha hera* and *C. dominula*, the two former being typical *Arctiadae* and agreeing with the definition of that family in the costal vein of the hindwing anastomosing with the subcostal to half the length of the cell, whilst in the two latter and also in the eight or ten other known species from the oriental region the costal vein does not anastomose with the subcostal, but only connects with it at a point. He contended that the genus *Callimorpha* should therefore be removed from the *Arctiadae* and

placed in the *Hypsidae*, where it is closely allied to *Nyctemera*, *Callarctia* and other genera, and that the fully developed proboscis, the non-pectinate antennæ, the smoother scaling, the more diurnal habit, and the larvæ being scantily clothed with hair all bore out the correctness of this association.

At the same meeting Dr. Chapman exhibited a portion of a stem of *Ferula communis* from the Ile St. Marguerite, near Cannes, showing pupa-cases of *Lozopera francillonana*. The larva feeds in the flower-heads and seeds, and burrows into the stem for hybernation. It does so anywhere, but in the majority of cases under the protection of the great sheathing petioles at the lower joints. As many as 30 or 40 and even 50 holes of entry may often be counted immediately above one node. When the larva pierces the stem it is full grown, and the entry holes are as large as or larger than those of exit. Dr. Chapman doubted whether it eats any of the material when it is freshest at the date of entry. The burrows in the stem are full of bitten but undigested material. These burrows proceed in all directions, but most frequently upwards, for several inches, often as much as eight or ten inches, and then approach the surface, and the burrowing appears to go on all the winter. In February and March larvæ may be found that have not completed their burrows. On completion the burrow approaches the surface, and the opening is of full calibre, but a delicate film of tissue is left to be ruptured by the emerging pupa. A number of vacant holes were also visible, being the exit of an ichneumon, which affects a large majority of this Tortricid. The species was believed to be *Chelonus inanitus*, Nees. The heads of several dead ones that failed to emerge successfully were to be seen at some of the holes. Dr. Chapman said he had placed a black circle round four holes as prepared by the larva of the Tortricid for emergence, that were still intact, and in two of these it was to be noted that the diaphragm was, as he had described, the cuticular tissue of the plant; in the two others, however, this had been damaged, and here the larva had made a silken diaphragm fortified with chips of the stem tissue. In the neighbourhood of the node especially the holes of entry were to be seen packed tightly with frass, which appeared to be uneaten material.

At the same meeting Mr. F. Enock exhibited living specimens of male and female *Ranatra linearis*, Linn., from Epping, together with the peculiar forked eggs, which he had observed laid by the *Ranatra*, as it rested upon the upper surface of the leaf grasping the edges with its claws. The short anterior legs are held well up close together, in a line with the body, the head raised about an inch from the leaf, while the tip of the abdomen (and ovipositor) is pressed against the leaf—a downward and forward movement being given. The ovipositor is thus forced through the leaf, then partially withdrawn and the egg extruded and forced into the hole as far as the forked filaments, which prevent it from going right through the leaf. The eggs are frequently laid in the half-decayed stems of aquatic plants. The peculiar *Prestwichia aquatica*, Lubbock, has been bred from the eggs of *Ranatra*.

At the same meeting Mr. Merrifield exhibited a number of pupæ of *Aporia crataegi*, and called attention to the want of correspondence between the markings on the pupal and those on the imaginal wing. On the latter, as is well known, there are no spots, only darkened nervures, the darkness spreading out a little on the outer margin, but

on the former there are black spots, some of them forming an oblique black row across the wing, a series of black marginal spots, and no darkened nervures, and, when the imago is about to emerge, so that its markings show through the transparent pupal wing, it is seen that its nervures run between the black marginal spots on the pupal wing, which in no way correspond with the broadening out of the marginal terminations of the dark nervures on the imaginal wings. There is great variety in the black markings on the pupal wing: in some they are few and small, in others they expand and unite so that more than half the wing is black. The ground colour of the pupa varies from bright greenish-yellow to whitish-grey. As might be expected of an insect whose larva pupates by preference on stems screened by foliage, its colour is not very greatly affected by its surroundings. On comparing some which had had yellow or orange surroundings with others which had had dark ones, it was shown that the former tended to yellow ground colour, and the latter to grey, having also an increase of the dark spots with which the thorax and abdomen are thickly strewn. Mr. Merrifield also exhibited some enlarged coloured photographs of the green and dark forms of *Papilio machaon*, obtained by causing the larvæ to pupate on green, yellow or orange surfaces, and on dark ones respectively. In answer to Mr. Jacoby he stated that though, when the pupa first appeared, it was always of the green form, it had also, if it was going to be a dark one, from the moment of its appearance a very few minute subdorsal and sublateral dark spots, and a little darkening of the anal end. The darkening began to spread in an hour or two, and at an ordinary temperature was complete in much less than 24 hours. Whether the pupa was to be green or dark was determined by the surroundings to which it had been exposed before it had cast off the larval skin, and if it was going to be a dark one, the dark colouring came on exactly the same in complete darkness as in light.

On June 28th the Yorkshire Naturalists' Union had a delightful outing in the Colne, Holme and Meltham valleys. That this was largely due to the excellent arrangements carried out under the mature guidance of the exceedingly popular President, G. T. Porritt, F.L.S., F.E.S., goes without saying. A large number of well known naturalists were present the Rev. W. W. Fowler, Dr. H. Corbett, Messrs. W. Tunstall, S. L. Mosley, W. Denison Roebuck, J. H. Rowntree, representing among others the entomological section. Associate members were present from all parts of the county, as well as from the adjacent counties, and after the various outings, a return was made to Crosland Hall, the residence of the President, where the members were most hospitably entertained by Mr. and Mrs. Porritt and their family. The satisfaction of the party was complete, and as the Rev. W. W. Fowler remarked when proposing a vote of thanks to the President and to Mrs. Porritt for their hospitality, "everything had contributed to their enjoyment, and they were all delighted." To southerners the virility of the Yorkshire Naturalists' Union is a matter for wonder, but there can be no doubt that such sturdy Yorkshiremen as Mr. Porritt have largely contributed to this end.

Dr. Corbett records (*Nat.*, p. 222) the simultaneous appearance of the co-migrants *Pyrameis cardui* and *Plusia gamma* at Doncaster, on June 17th, 1900.

The Lancashire and Cheshire Entomological Society: Garden Party.

F. N. Pierce. R. Tait. A. Harrison. W. Webster.
H. Tonkin. J. Arkle. R. Newstead. R. Freeman.
H. B. Prince. B. H. Crabtree. W. H. Holt. W. Kentish. H. Locke.
G. E. Cheesman. T. G. Mason. C. H. Walker. H. Capper. R. Wilding. Dr. Ellis.
C. Dalmer. J. Roxburgh. F. P. Marratt. S. J. Capper. J. Murray. Dr. Cassall. Dr. Bailey.
W. H. Tyerman. Dr. Cotton.

Entom. Record, etc., 1900.

The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XII. No. 9. September 15th, 1900.

The Lancashire and Cheshire Entomological Society: Garden Party (*with plate*).

On Saturday, June 23rd, Mr. S. J. Capper, F.L.S., F.E.S., gave a garden party to the members of the Lancashire and Cheshire Entomological Society and other entomological friends, at his residence, Huyton Park, Liverpool. There was a large gathering, and the visitors fully appreciated the kindness of their host. Ever since the foundation of the Society, now twenty-three years ago, Mr. Capper has been the President, and has been associated with men whose names stand high in the elucidation of our insular insect fauna. All the older lepidopterists know of the keen rivalry that existed between the Lancashire and southern collectors, and are also well aware how well the northern men held their own in field work, especially in the working out of the life-histories of the Micro-Lepidoptera, whilst the younger entomologists have also been well to the fore, as the lists for the county, compiled by Dr. Ellis, fully show. Just how much of the excellent results shown by the Lancashire lepidopterists is due to Mr. Capper it would be difficult to say, but year after year he has, by sympathetic help, by kind instruction, and by a liberal generosity, aided all the recruits who have joined the ranks of the Society, and his large collection, probably unequalled in the northern counties for its richness in bizarre aberrations and local forms and races, has been at the service of all who wished to consult its contents. His educational collections are also widely known, and the young (and old) entomologists of Lancashire and Cheshire have always found in Mr. Capper a generous helper and friend. We understand that at the present time Mr. Mosley is engaged in painting the best marked aberrations in the collection, and that some 400 have already been done, but we do not know yet how these are to be published so that they may be of general value to science, and so that the students of variation may be able to gain the greatest possible good from the specimens thus reproduced from this collection. One could wish that wealthy amateurs like Mr. Capper, Mr. Webb, &c., would publish figures of the best aberrations in their collections for general use. Perhaps photography will enable them to do this cheaply ere long.

A glance at our photograph will show the strength of the Lancashire and Cheshire entomologists. A society that contains names like those of Dr. Ellis, the compiler of the Lancashire and Cheshire lists of Lepidoptera and Coleoptera, Mr. R. Newstead, one of the first

authorities in the world on the *Coccidae*, and equally well known for his wide and exact knowledge of economic entomology, skilled observers such as Mr. C. H. Walker, Rev. R. Freeman, Dr. Bailey, Mr. F. N. Pierce, &c., must be considered strong. Probably next to the President, the Society owes most to its indefatigable secretary, Mr. Pierce, and his authority on the genitalia of Lepidoptera remains unchallenged. Messrs. Crabtree, Prince, Tait, Arkle, Locke, Wilding, Roxburgh, and Drs. Cassel and Cotton, will be known to most of our readers as active coleopterists or lepidopterists, and, indeed, one might almost exhaust the list of names if one were to enumerate one's old friends and correspondents.

That these gatherings do much to foster the spirit of unity which enables work to be followed out much more thoroughly and successfully is certain. Year by year, the old Adam, that led men engaged in similar branches of work to look upon each other as rivals and to hide their knowledge from each other, is dying out, and a system of co-operation between lepidopterists in this country has led to results totally impossible under the old conditions. One is not so certain that one can say quite as much of the coleopterists who do not seem to trust each other so freely in imparting knowledge as do their more numerous brethren studying the butterflies and moths.

Nor must we forget, in our estimation of the success achieved by these friendly gatherings at Mr. Capper's house, how much is due to the kind hospitality and care bestowed on the guests by Miss Capper, who insists on making each and every of the visitors feel thoroughly at home. We write with a very full remembrance of the generosity and kindness of the President and his eldest daughter, and our last word is to wish that the Lancashire and Cheshire Society may always have as excellent a President as their present one, and that the latter may long remain the President of the Society to continue directly and indirectly his support of our favourite study and to foster with his sympathy the love of entomology in all the young recruits to our ranks in his district.

Lepidoptera in the Hautes-Alpes: Abries.

By J. H. and J. W. TUTT, F.E.S.

Mountains reared upon the mountains,
Forests stretching far and near,
Swift, wild streams that ceaseless murmur
Songs of rest to human ear,
Scenes of beauty, silent, peaceful,
Whispering dreams for many a year.

Little appears to be known about the insects of the Hautes-Alpes, and the district appears to be rarely visited by English tourists. The guidebooks are neither very accurate nor illuminating, and it would appear to be largely a *terra incognita* to all except a few of the wealthy residents of Marseilles and the larger towns of Provence, who have long since appreciated its charms, and now regularly spend a part of the summer months in these wild and altogether delightful valleys. The district we selected this year in which to spend part of our usual holidays was that known as the Queyras district, so-called from the Château Queyras, which is splendidly placed on an isolated rock, and near which an important village, with apparently good inns, has now

sprung up. The valley is drained by the Guil, the limpid waters of which, in the river's upper course, present a striking contrast with those of the muddy Ubaye that drains the valley in which Larche and Barcelonette are situated. The valley, so far as we were able to investigate it, swarms with insect life, and it is possible that, when attention has been drawn to this delightful spot, some other entomologist with longer leisure will visit the place and supplement our poor list with his captures. We say "poor" advisedly, as, during the time (August 9th-16th) that we were in the valley, we did a great deal of walking and little real collecting. We should say that July would be decidedly a better month than August throughout the valley.

It may be well, therefore, in view of the possibility of further investigators visiting this beautiful district to point out the route taken. Train to Grenoble (*via* Lyons or Chambéry), where one changes for Veynes, this ride taking one over one of the most remarkable alpine railways of which we know. At Veynes, one changes again for Mont-Dauphin-Guillestre, a few stations short of Briançon, so that the latter part of the route skirts the south-western and southern borders of the Dauphiné Alps. Here a diligence meets the train, and a five to six hours' ride up the valley brings one to Abriès, where we stayed at the Grand Hôtel d'Abriès, an excellent establishment from every point of view—new, large, well furnished, comfortable, with all modern sanitary arrangements, and a first-class cuisine. Our surprise at finding this excellent hotel was great, as it was quite unmentioned in the guide books (Baedeker, &c.), although it had been opened three years. Nothing that we could say would be too high praise for the treatment we received whilst here, or the success attained by the proprietor in making his guests thoroughly comfortable. The inns mentioned in Baedeker and Murray appear to be very poor indeed; by comparison with the Grand Hôtel they are quite unthinkable.

The ride through the valley is something to be remembered. It is indeed a picturesque and romantic drive that will long live in the memory, characterised by its—

> Deep, deep gorges, where the torrents
> Breathe their murmurs from the gloom,
> And the clashing of the waters
> Rises from a hidden tomb.

One sees in the Alps occasionally some fine cañons, but those between Guillestre and the Château-Queyras would require a lot of beating. The defiles are, both at the entrance of the valley, and again near La Chapelue, of the grandest possible description, only in the former case, the road leads high along the side of the mountain, and one looks down here and there into the bed of the torrent which is often hidden, whilst in the latter case the road runs along by the side of the river, and the almost perpendicular rocks rise on either side of the narrow bed to a height of from 200ft.-300ft., often, however, overhanging considerably and presenting a scene of wild grandeur rarely to be witnessed even in these regions.

The more open slopes that occur between these defiles are clothed with sweetest scented lavender, and from the blossoms clouds of *Erebia neoridas* and *Polyommatus escheri* take wing, whilst, from the clumps of *Eupatorium*, *Callimorpha hera* takes its stately flight when rudely

disturbed in its repose by the rush of the passing diligence. *Satyrus alcyone*, deep-coloured *Gonepteryx rhamni*, swift-flying *Colias hyale* and *C. edusa*, *Melanargia galathea*, not in the best condition, *Epinephele lycaon* and apparently *Erebia liyea*, are all noted in abundance before La Maison du Roi is reached, and already it is quite evident that *Polyommatus damon* is to be the "blue" of the valley, as, indeed, it afterwards proved to be, occurring in countless thousands in both sexes everywhere. It appears impossible to name the Fritillaries as one passes them, but one is certain of the road-loving *Argynnis lathonia*, that fans its wings so delightfully, *Dryas paphia*, *Argynnis adippe* and *A. aglaia*, as also the bright-tinted males of *Melitaea didyma*, whilst the females of the latter are evidently exceedingly variable. *Parnassius apollo*, too, very large fellows, come lazily flying down, and swift-winged *Pieris daplidice* cannot be mistaken, nor can large full-coloured *Papilio machaon*; the skippers of the valley are evidently *Thymelicus lineola*, *Pamphila comma* and *Syrichthus alveus*, whilst *S. sao* is worn and evidently over. La Maison du Roi is an inn apparently exceedingly well placed for working the nearer end of the valley, and in a most picturesque position, and here we might add that the valley would be a perfect paradise for the photographer. Our great regret, however, is that we were not sufficiently well-versed in geology to unravel the many geological problems presented by the valley, and there were many times when we would have given much to have had a really good geologist for a companion. The inn, La Maison du Roi, does not look, however, especially inviting, although one knows from experience that many alpine inns are much more comfortable inside than their outward appearance would lead one to suspect.

We have said before that the valley is full of insects—Orthoptera, Lepidoptera, and in particular Diptera, some of which can, on occasion, bite most furiously, and a friend's satisfying description, "beautiful beast," was frequently indulged in as one squeezed the life out of a persistent green-eyed gad-fly, with the greatest satisfaction. Our journey up the valley in the afternoon and evening, 4 p.m.-10 p.m., and our journey down in the morning, 8 a.m.-1 p.m., proved to the hilt that the statement was literally true, but what insects these wild and romantic valleys really hide we do not know, dozens of species of Rhopalocera must be hidden in the sequestered nooks that one sees everywhere, and these, only a prolonged stay or previous knowledge is likely to discover. All we can say is that the ground is wild, rough, and almost everywhere uncultivated, and that Château Queyras would appear to be a really good centre for the middle part of the valley. There is one remarkable village between Château Queyras and Abriès, called Aiguilles. Everyone knows the squalid and unsavoury nature of the average cottage of an alpine village. Here, side by side with cottages of the poorest description, large mansions have been built by natives, who, having emigrated to America, have made a considerable fortune in "cheese," and then returned to their native village, where their money makes them people of importance, and erected themselves those modern dwellings that look so strangely out of place in this little hamlet. At least twenty of these are to be found in this one small village.

Our centre, as we have said, was Abriès, a village 5,085 feet above the sea, and it was here that our walks were taken and our collecting,

such as it was, was done. It may be well to note the places where insects were observed abundantly. Almost as soon as one leaves the village, on the road towards the Italian frontier, one finds a mass of tangled vegetation covering the waste ground by the river side—willows, *Hippophaes* and barberry among the shrubs, thyme, trefoils, dwarf epilobium, scabious and *Centaurea* among the flowering plants, may be noted. This spot should be visited, for, here, not only do the regular insect inhabitants of this part of the valley dwell, but visitors from the high Alps—*Colias palaeno*, *C. phicomone* (many), *Pieris callidice*—are to be taken. Among the willows *Eucanessa antiopa* is already on the wing, and on the nettles by the roadside the deserted larval nests of *Pyrameis atalanta* are abundant, although a single imago only showed that the perfect insects had not yet fully emerged; *Aglais urticae* was the only other Vanessid, and this species was found as larvæ, pupæ and imagines. Here and there one can get from the roadway to the rough slopes and gullies, and one finds insects on these also in great abundance. *Papilio machaon* was occasionally seen, usually worn and tailless; *Parnassius apollo* flew everywhere, even about the roads, and was frequently observed about the front of the hotel. *Aporia crataegi* was one of the commonest insects when we arrived, but the way in which it almost completely disappeared during our stay was most remarkable. A single *Pieris callidice*, as we have said, was unexpectedly taken not a quarter of a mile from the village; *Pieris rapae* and *P. napi* ab. *napaeae* were abundant, but *P. brassicae* was scarce, and *P. daplidice* only observed some distance lower down the road than the hotel, although *Colias edusa* and *C. hyale* covered the ground where *C. phicomone*, in considerable abundance in both sexes, and a single *C. palaeno* were taken. That *C. phicomone* naturally lives at this level in the neighbourhood of Abriès is certain as the species was observed egg-laying on the waste flats. *Leucophasia sinapis* was not seen, although we suspect that it must occur; it was possibly over. *Gonepteryx rhamni* males were particularly brightly coloured, no females were seen, so that the species was evidently not fully out. *Melanargia galathea*, common down the valley, does not appear to reach so high as this. The Fritillaries were in great abundance. *Argynnis lathonia* everywhere, *A. adippe* abundant below the hotel, but beginning to go over, whilst *Dryas paphia* was quite scarce and not in good condition. *Argynnis aglaia* and *A. niobe* in thousands everywhere, in beautiful condition, varying much in size, the latter also presenting beautiful examples with the silvery spots of the underside of the hindwings particularly brilliant. Near the hotel many of the *A. niobe* were no larger than *Brenthis euphrosyne*, whilst others were of large size and full colour, so that possibly the larvæ of the small ones had been badly placed for food. *A. amathusia* was not uncommon near the river. *Melitaea didyma* was in the very pink of condition, the males bright red, sparkling like "coppers" in the sun, whilst the females showed a splendid range of variation, many being almost black in the ground colour, the fulvous limited to small areas on the hindwings; none appeared to have the brighter fulvous colour of the females found at Aix-les-Bains and other localities at a low altitude.

(*To be continued.*)

The relationship of Philea (irrorella), Cybosia (mesomella), and Endrosa (aurita).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The second volume of the *British Museum Catalogue of Phalaenae* is as striking a monument of industry on the part of Sir George Hampson as the first. It contains those families that are allied to the *Arctiadae*, *viz.*, the *Lithosianae* and *Nolanae*. Though I believe the reasons against this association of the *Nolanae* to hold good, my high estimate of the value of the work is not affected.

Having no special knowledge of these groups to enable me to test the soundness of the classification within the groups, I have looked up the little group of *Endrosa*, *Philea* and *Cybosia*, with which I happen to be familiar. The first point to strike one is the accuracy of the characters laid down for each genus and species, short and condensed, and implying much work compressed into small space, and giving one some idea of the labour involved in the whole volume, and if equal accuracy obtains elsewhere, the value of the work is certainly great. The next point is that these three genera are separated and defined, and their order and phylogeny determined chiefly (apparently) by the one fact that the point of origin of vein 2 of the hindwings varies a little.

In *Philea* it is from the *middle* of cell, in *Cybosia* from *beyond the middle* of cell, and in *Endrosa* from *well beyond* the middle of cell. The other characters are of minor importance or very inconstant. It is true, for instance, that vein 8 of the hindwing usually rises nearer the end of cell in *Endrosa* (*aurita*) than in *Philea* (*irrorella*), but I have specimens of *aurita* with it quite as far back as is usual in *irrorella*. The ♂ genitalia are almost identical, probably quite so if one took a long series. Those of *Cybosia* (*mesomella*) are quite different. Reverting to vein 2 of forewing, this also like 8 of hindwing varies much in position and length, the average position is as stated, but many specimens overlap. The only constant differences between *aurita* and *irrorella* are in the density and length of the hairs and scaling, and a greater breadth of the palpi in *aurita*. But these are certainly not generic differences, and do not admit of their being separated by *Cybosia* which is structurally distinguishable in antennæ and various other particulars.

In the phylogeny given, however, *Philea* gives rise to *Cybosia*, and *Cybosia* to *Endrosa*, and yet *Cybosia* is more distinct than are the other two genera. Not only, for instance, are *irrorella* and *aurita* so close as to belong really to one genus, possibly distinct from that containing *mesomella* (*Cybosia*), but it would be possible to say something as to their even being races of one very variable species. The curious auricular (?) development of the 3rd trochanters in *Endrosa* and *Philea*, which is wanting in *Cybosia*, is not alluded to, but is a strong proof that *Cybosia* cannot be wedged between them.

The Sagacity of Larva of Galleria mellonella (cereana), Linn.

By R. HAMLYN HAMLYN-HARRIS, F.R.M.S., F.Z.S., F.E.S., &c.

It is a matter of no small interest to note how the larvæ of certain species of insects show a decided instinct for self-preservation. Among many, more especially among imagines, we are in possession of varied

and interesting cases of sagacity, in fact we might almost say their name is legion, but the following experience may be somewhat unusual considering the subject under consideration, and in any case will be another contribution to the biology of the Wax moth.

Some time ago I had collected three larvæ of the above species from my experimental apiary for microscopical examination, and had put them into a cardboard box in order to rear pupæ, I also gave them a small piece of artificial comb to feed on. However, two of them spun their threads directly underneath the comb, whilst the third was thereby entirely shut off from the store of food, and directly the larva approached the other two she was instantly driven away. This continued until the first two sallied forth to pupate elsewhere.

It may be a subject worthy of note to record that I did all I could to coax this unbefriended grub to throw in her lot with the others, but everything was of no avail, until ultimately she took possession of the empty passages and devoured the remaining portion of food, by which time one of the others had actually pupated. What was my surprise on examining the box a day or two after to find that the larva had torn open the puparium, and turned the chrysalis out of its resting-place—thus making room and opportunity for herself to undergo that same period of rest.

The conclusion I have come to as an explanation of this proceeding—the whole of which lasted no more than a week—is that the larva, through some means or other, was prevented from spinning quantities of threads, and that she had therefore learnt by natural instinct how to overcome that difficulty; or could it be—that a spirit of revenge had seized hold of her—revenge at being excluded from the liberal board? How was it she knew her strength and ability directly her foe lay helpless, having undergone that process for which end she herself was straining every nerve to bring about that like change? and did she not know that she would thus be secure and unmolested until the time should come for her to enter into that much longed for bliss of the imago state?

Naturally all my sympathies are with the first view being the most likely, the more so as we know cases—such for instance as recorded by the then Sir John Lubbock—of spiders unable to spin more than a certain number of webs, and even if the glands and the organs directly in relationship thereto, were in no way injured—is not this possible, especially as throughout the whole proceedings this larva showed herself incapable of spinning? I think, also, that we may read in this interesting case, the way adopted by nature, through natural instinct, teaching the feeble to help themselves, suggesting to the helpless a way of self-preservation for the perpetuation of its species.

British Lepidoptera.*

By WILLIAM BATESON, M.A., F.R.S., F.E.S., &c.

It is pleasant to write a few words in appreciation of the second volume of Mr. J. W. Tutt's *British Lepidoptera*. Of the great utility of this work there can be no doubt whatever, and the punctual appear-

* A Natural history of the British Lepidoptera. By J. W. Tutt, F.E.S. Vol II., pp. 584+viii. Published by Swan Sonnenschein & Co., Paternoster Square. Price 20s. net.

ance of Vol. II will be a matter of general congratulation amongst naturalists.

Mr. Tutt's work aims at being in the first place a complete collection of all that is as yet known of the natural history of the species dealt with. These books are no mere compilation, but in the fullest sense original treatises. No pains have been spared to get together everything that relates to the structure, distribution, variation, life-history and habits of each form in its several stages. Many of the facts thus given are new, a large part being the results of the author's own direct observation. Moreover, much of the information here published has been communicated privately to Mr. Tutt by his numerous correspondents, and the mass of facts given at first hand is thus greatly increased. This is especially the case in regard to the life-histories, which in very many instances have been worked through in minute detail by Mr. Tutt and his coadjutors expressly for this book. Owing to the wide appeal which the author has made to living entomologists for such personal records, and to his laborious researches into the literature already printed, the books probably represent the sum of existing knowledge on the subjects contained.

It is a special charm of Mr. Tutt's treatise that the reader has a comfortable sense that his author is giving him no scamped work. Everything capable of verification has been verified, and nothing is repeated in slovenly fashion unchecked. For such a work not only professed entomologists, but all naturalists who from time to time require precise information as to lepidoptera, will be grateful to Mr. Tutt, and his books will be required in every working library of natural history. Nothing of the kind has hitherto been attempted, and by reference to them much searching and weary correspondence will be avoided.

The present volume deals with the Psychides and part of the Lachneides. Whether the views adopted by Mr. Tutt on questions of classification and the like are sound or not can, of course, only be judged by specialists, but it will be evident to any student of zoology that he has attacked these problems in a most fruitful way, and that in each of the numerous discussions of special questions he has provided a marshalling of the facts which will help succeeding students. Several sections of this kind are introduced relating to general questions of the morphology of lepidoptera, especially the nature of metamorphosis and the structure of pupæ. In addition to these there is an important chapter written by Dr. T. A. Chapman on the phylogeny of the lepidopterous pupa, a subject on which he is the recognised authority.

In connection with the significance of larval moults, reference is made to the interesting observations of Chapman on variation in number of moults in *Arctia caia*, but there appears to be no account of Dyar's remarkable evidence relating to similar variations. According to Dyar's observations on several species, the larva—as measured by the width of the head—increases in size at each moult in a definite geometrical ratio, and when stages are added or omitted the ratio is halved or doubled accordingly. It is most desirable that further investigation of this curious phenomenon should be made, and it would have been well to direct the attention of students to the subject. It is noticeable that while morphologists, in reasoning based an

developmental histories, have constant occasion to postulate intercalation or suppression of stages, almost no variations of this kind have yet been systematically observed. Those instances recorded in lepidoptera offer an unusually good field for research.

When an author has done so much for his readers it is a thankless task to find fault. Still one cannot help reflecting what a magnificent book this might have been if the mass of material here brought together had been fully digested and arranged. It is no doubt impossible for a very busy man to carry out such a task, and we are grateful for what is already done. But on turning over the pages it is sad to find a profusion of matter relating to questions of general scientific importance buried in the systematic chapters of both volumes, where probably they will never be seen by those who would most value them. To urge that these should have been extracted and printed together with the chapters on general morphology apart from the course of the systematic work is a counsel of perfection. Mr. Tutt will, however, greatly increase the gratitude of students if he will in the next volume provide a copious subject-index, which, though an arduous task for any one else to perform, would cost him comparatively little labour. So long as merely the names of the insects are indexed as they occur, half the author's labour is in vain.

As another practical point it may be urged that the references should be more freely repeated. In a good many cases references to publication of notes or observations of a special character are not given with sufficient emphasis, and are only to be found by working through the profuse lists given under the heading "Synonymy." To remedy this is doubly important in a work where so much is taken from manuscript and other private sources. After a long hunt for the original source of a statement here given with a name of an authority affixed, it may prove at last that the statement was privately communicated to the author. In all such cases it should be plainly indicated that the authority was manuscript or verbal. This need not lengthen the book, and on the other hand space might be saved by cutting down some of the long lists of localities, which, in the case of generally distributed species are hardly worth the considerable trouble they must have taken to prepare. It will be understood that these remarks are made in no unfriendly spirit, but simply in the hope that we may lose none of the benefits which Mr. Tutt's industry has conferred upon us.

Some Diary Notes on the Season's Collecting.

By W. J. KAYE, F.E.S.

The first insects noted during the year were *Phigalia pedaria*, *Hybernia rupicapraria* and *Anisopteryx aescularia*, which were seen on gas lamps on February 26th, at Worcester Park. On March 3rd *Amphidasys strataria* appeared in the breeding-cage, and the weather appeared so favourable that an outing was made a week later to Wimbledon Common, in company with Mr. May. *Asphalia flavicornis* was unusually common, something like twenty specimens being secured after a search of about two hours. Textbook directions for finding this insect recommend that bushes in preference to trees should be searched. This is no doubt sound advice, as the larvæ certainly prefer the bushes to feed up on. But once the imagines have had a flight

they settle anywhere it would seem, as some were seen on aspen, and some even on oak, besides on the trunks of large birch trees. On April 7th, an evening visit to Wimbledon resulted in some larvæ of *Aplecta tincta* and *Triphaena fimbria*, one worn *A. flavicornis* and some fairly fresh *Larentia multistrigaria* were also seen. At Oxshott, on April 22nd, *Panolis piniperda* was over, as likewise was *L. multistrigaria*, but *Pachnobia rubricosa* was in good order and fairly numerous. One *Xylocampa areola* was caught flying round a sallow, and the net was also serviceable in securing some very fresh *Eupithecia nanata*. A fine pinkish-coloured *Taeniocampa gothica* was taken (more by accident, it must be said), for renewing purposes. On May 2nd, *Cyaniris argiolus* appeared in the garden at Worcester Park. As at many other places this year the species was noted for the first time. The sudden appearance of this insect in many places in the southern and midland (I have not heard if northern also) counties, where previously it was almost unheard of, is peculiarly interesting. One is tempted to enquire whether the species maintains an existence regularly, but in such scanty numbers as to pass unnoticed, in all these recently observed localities, or whether there has been a dispersal or migration from anywhere. Our Editor will probably attack this species in his excellent articles on "Migration and dispersal" as soon as the facts can be made known. On May 17th a visit was paid to some aconite plants—growing at Surbiton—for larvæ of *Plusia moneta*. Eight very young larvæ, as was supposed, were taken from the spun-together young shoots. But it was soon apparent that all the eight were not *Plusia* larvæ. In less than a week one had spun up and revealed itself to be a Tortricid. Three only of the eight turned out to be *P. moneta*. Subsequent visits gave similar results. The Tortrices proved, on hatching, to be *Sciaphila virgaureana*. A day at Horsley on May 27th gave the following results: *Nemeobius lucina*, very fresh, hardly fully out. *Drepana cultraria*, six ♂ s somewhat worn. *Callophrys rubi*, evidently going over. *Euchloë cardamines*, fresh. Two or three fine *Bapta bimaculata* and an odd specimen or two of *Melanippe sociata*, *Phytometra aenea*, *Strenia clathrata* and *Fidonia atomaria*. Back towards Effingham some larvæ and cocoons of *Plusia moneta* were met with. On June 4th *Ptilodontis palpina* flew into my room. I rarely get more than one or perhaps two in a season here. On the following evening I was much pleased to know that *Clostera curtula* still exists in the neighbourhood, a fine ♂ came to light. *Agrotis puta* and *Grammesia trigrammica* also turned up. On June 6th, at Horsley again, *Polyommatus astrarche*, *Ennychia cingulata*, *E. nigrata* and *Bapta bimaculata* were the best species noted. *Euclidia mi* and *E. glyphica* were flying together, the former being much the commoner of the two. On this date a specimen of *Cidaria sagittata*, hatched from the Wicken contingent of larvæ taken the previous August. This specimen, and another that hatched on the 20th, are the disappointing result produced by twenty larvæ. On the 9th, quarters were secured at Wicken for a week, the particular insects to be searched for being *Hydrilla palustris* and *Hadena atriplicis*. Diligent work failed to give either. Of the usual insects obtainable at this time of year a fairly good account can be given. Mr. Dixon, who had joined me for the week-end only, had noticed a very large buckthorn bush in flower, and also that during the day the Hymenoptera were greatly attracted to it. I had heard that *Collix sparsata* flew round such bushes

at dusk, and we accordingly both went in search of this little species as soon as the sun was down. Many insects soon began flying, many of which were noticed to be Noctuids. As soon as it was dark I lit an acetylene lamp with which I had provided myself, and as the light was directed upon the bush by one of us, the other netted and boxed *Meliana flammea*, five, *Apamea unanimis*, seven, *Neuria reticulata*, one, *Hadena dissimilis*, one, besides some *Collix sparsata* and other commoner Geometrids. The following night the same insects were taken, but *A. unanimis* was "off" and *M. flammea* much more "on." *Arsilonche venosa* was taken the following evening singly. The extraordinary scarcity of this insect in Wicken now, after having been so abundant in 1895, is attributable, one is inclined to think, probably, to the parasitic Hymenoptera which attack this species having got in the ascendancy. In the year quoted, when larvæ (and imagines) were so abundant, not more than 7 or 8 per cent. produced moths. Since that time the species has got scarcer and scarcer until now when there are actual doubts as to whether the insect is going to maintain itself in Wicken.

On Monday, the 11th, Chippenham was visited. Thoughts of a round number of *Plusia orichalcea* larvæ betook themselves when the tall figure of Mr. Farren loomed in sight. An out-of-the-way corner gave me two larvæ, and I considered myself lucky. The same evening, in Wicken, *Hydrelia uncula* appeared. Four specimens were taken. On the 14th *A. unanimis* completed my series, and besides *Hadena dentina* in abundance, a solitary specimen of *Leucania obsoleta* was secured on the sugared reeds. Netting produced *Nascia cilialis* and *Herminia cribralis*, probably the first of the season, as on the previous evenings they were absent. The work of the day was devoted to a run over to Tuddenham. Just previous to a severe thunderstorm a fine specimen of *Acontia luctuosa* was secured, and also the specimen of *Colias hyale* (already recorded, *Ent. Rec.*, *antea*, p. 219). Nearly every night gave one specimen of *Neuria reticulata* on the sugar. But the 12th produced three. On the 15th an annual visit was made to Leicester, where my good friend Mr. Dixon acted as host and guide to old collecting grounds. Next morning a journey was made to a wood near Uppingham, for *Carterocephalus palaemon*. The local skipper was found, but in such poor condition and in such few numbers that showed we were quite a fortnight too late, notwithstanding the backward season. This butterfly does not seem to be affected by the seasons much, if at all, the last week in May seeming to be its stereotyped time for appearance. Later in the day a "hark back" was made to Owston Wood. Larvæ and pupæ of *Thecla w-album* were unusually plentiful, and on tree-trunks *Melanthia albicillata* was quite the commonest imago. The choosing of fir-trunks for a resting place seems odd, unless this insect has an instinct that it may be mistaken for a bird-dropping. Quite a variety of Geometrids were at rest on tree-trunks. *Cidaria silaceata*, *C. suffumata*, *C. corylata*, *C. immanata*, *Lobophora hexapterata* (going over), *Tephrosia crepuscularia* (one), gave a goodly bag for the day's work. At dusk, round the maple bushes, *Asthena luteata* was plentiful, and as both of us were in want of this little species the few remaining boxes were quickly filled, and a race for the train ended the day.

(To be continued.)

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

Whatever interest may attach to what we may term the internal migration of *Anosia archippus* within the Nearctic region, much greater interest is felt in its movements to distant parts of the world. Its wandering habits have led it to seek other shores, and during the last half century it has practically encircled the globe. Before, however, dealing with this, one may note that Walker observes (*Ent. Mo. Mag.*, xxii., p. 217) that at Monte Video the well-marked form *erippus* occurs in December, and that in 1881, at Callao, *A. archippus* was one of the commonest butterflies of the district, and was especially abundant in January and February, and scarcest in July, though one could make sure of seeing the imago on the wing almost any day throughout the year. Apart from the range of the southern var. *erippus*, the insect would appear to cover in America about 90° of latitude, since Walker records it from Bolivia and the Amazon district, and specimens have been captured at Moose Fort 50° 20′ N. lat. and at Esquimault, in Vancouver Island, at about the same latitude.

No doubt can exist that it was originally an American insect, and it appears to have reached the Hawaiian Islands, some 2000 miles from its American home, about 1850, contemporaneously with the introduction of its food-plant, the *Asclepias*. In 1857 it appears to have reached Ponapé, one of the Caroline Islands, about 2000 miles from the Hawaiian Islands. In 1863 it was taken in the Friendly Islands; in 1867 in Tutiulla, one of the Samoan Islands, and in 1869 was observed in two others, Upolu and Savaii. In 1868 it was seen in the Pacific Ocean, 500 miles from land. In 1870 it was found in the Society Islands; Miskin first recorded it from Australia in 1870, when it appeared in Queensland; in 1872, it was noted at Melbourne, but has now spread throughout all the warmer parts of the island, and has also been taken in Tasmania. Walker records it as having occurred in thousands in the Sandwich Islands, in 1873, and notes it as being the commonest butterfly in the Marquesas, where it was unknown before 1860. In the Society Islands and the Cook and Hervey Islands it is common, and has even reached the remote little island of Oparo or Rap-á far away to the southward; it is also established in the Malay Archipelago. He further notes that, in 1883, during the cruise of the "Kingfisher" among the South Sea Islands, this was usually the first butterfly observed, and in some of the islands was exceedingly abundant considering how recently it had been introduced. Mathew says that it is found through the Samoan, Friendly and Fiji Islands, being especially abundant in the latter, has reached the North Island of New Zealand, as well as Norfolk Island, whilst in New Caledonia, where it became very abundant, it has practically exterminated itself by the destruction of the food-plant (an introduced weed) by the larvæ. In the New Hebrides, Solomon Islands, and New Guinea, it has become common, and Semper has recorded it for Celebes, whilst Kirby says that it has been taken in Java, and a specimen was captured on April 19th, 1889, in the Straits of Malacca, between Penang and Singapore. So much for its westward migration.

With regard to its spread in an easterly direction, we may first state that it is abundant in the West Indies and has, for some years

past, been established in the Bermudas. In 1864 it was taken in the islands of Fayal and Flores in the Azores, and in 1877, Grassal took it in France, at La Vendée. In the previous year, however, it had occurred in the British Islands, at Hayward's Heath (Crallan), at New Close near Keymer (Wood), near Neath (Llewelyn), and in 1876 or 1877 an example was taken at Poole (Eaton); King has several specimens taken, in or about 1880, on board a vessel in mid-Atlantic on its voyage out, some 200 to 300 miles from the British shores whilst flying about the rigging of the ship. In 1881 a specimen was captured at Snodland, in Kent (Hawes), and in 1884, at Ventnor in the Isle of Wight (Westropp), whilst in the autumn of 1885 about a dozen specimens were recorded from Dorset (Cuttell), Devon (Hellins), Cornwall (Anderson, &c.), and the Isle of Wight (Billings). In 1886 more were captured in the south of England, at Swanage (Mowlem), Bournemouth (McRae), near the Lizard (Jenkin), in Pembrokeshire (Wilkinson), whilst others were reported from Guernsey (Luff), Gibraltar (Walker), and about 1890 a specimen was captured off the coast of Portugal some 60 miles from the Cape of St. Vincent (Harker). In 1890 another example was seen at Eastbourne (Clarke), and in June, 1896, a specimen was observed at Lymington (Waldo). The insect, however, has not yet made any permanent settlement in these islands, nor on the European continent.

It would appear that in all those countries in which *A. archippus* has settled, its food-plant is some species of *Asclepias*, mainly *Asclepias curassavica*. The seeds of this plant are, Walker says, eminently fitted for dispersal, being very minute and enveloped in a great quantity of light cottony down, whilst the great hardiness of the butterfly, its almost complete exemption from the attacks of enemies, joined with its well known migratory propensities and habit of assembling in swarms render its chances of wide dispersal and ready adaptation to a new home especially favourable. Mathew states that he has often seen *A. archippus* "flying at a great height above the ship, sometimes more then 200 miles from the nearest land. During a cruise between New Caledonia and the Solomon Islands, they were to be seen every day, often in numbers. They looked as if a steady migration was taking place, and the south-east trade wind, which was blowing strongly at the time, was greatly in favour of the butterflies accomplishing their journey in safety." Walker further adds that he has seen *Danais chrysippus* (*misippus*), a much smaller and less powerful insect than *A. archippus*, flying about the ship when she was 700 miles from the nearest land (the African coast) still strong on the wing and apparently in good order.

Walker concludes that it is not difficult to imagine one of the great migrating swarms of *A. archippus* being blown out to sea from the Californian or Mexican coast, and travelling with the north-east trade wind, the greater number by far perishing *en route*, but a few stragglers of the host reaching the Sandwich Islands. This may have occurred many times before the introduction of a suitable food-plant, the butterfly necessarily failing to establish itself, but once the *Asclepias* was introduced it would soon be quite at home. Thence it would have no such tremendous expanse of ocean to traverse in order to reach new lands, the scattered islands between the Sandwich group

and those in the South Pacific, though small and mostly barren, might serve as stepping-stones in its progress. The distances between these Islands, though great enough, are nothing like the first great step from America to the Sandwich Islands, and not more than the light or downy seeds of the *Asclepias* could be carried by the agency of winds, &c. It is significant, too, that the Pacific specimens all agree with the North American forms, the larger pale spots in the black apical portion of the forewings being tawny, not white as in those from the Peruvian coast of South America. The same remarks may apply to its dispersal across the Atlantic, but owing to the much more stormy character of this ocean, and the less steady winds, the chances of the butterfly crossing a given extent of ocean in safety are less favourable. Walker concludes his excellent paper (*loc. cit.*, p. 223) with a list of the localities from which the species has been sent or in which it has been observed, and which is much too long to be repeated at length here.

In the history of the distribution of these insects—*Anosia archippus*, *Pyrameis cardui*, *Colias edusa* and *C. hyale*—we see, then, a fight carried on in nature against climate and other powerful forces, by butterflies of strong flight and great activity, with marvellous powers of endurance, and with great energy and reproductive ability, in which the excess of fecundity is, to a great extent, wasted, and thus we observe how it is that such species are prevented from becoming pests, as they most certainly would do if the whole of their progeny had to be supported within the comparatively narrow limits in which they are able to exist throughout the whole year.

COLEOPTERA.

The eggs of Clythra 4-punctata.—The eggs described (*ante*., p. 213) by Dr. Chapman were laid by a specimen of *Clythra 4-punctata* I had bred from a pupa-case taken in the Blean Woods. I put a male and female in a glass-topped box. Soon after copulation the male died. The female laid twelve eggs and then died. I sent these eggs to Mr. Tutt, as I was just off to Scotland, and was afraid if I left them at home the young larvæ might hatch and die, and if I took them with me the eggs might get damaged. In writing to Mr. Tutt to ask if the eggs hatched, before I had seen Dr. Chapman's second note, I suggested that the beetle might lay the eggs in nature on, or in, the ant hillock, and that all the eggs might then have capsules to serve the young larvæ as a protection till they had had time to make cases for themselves. Dr. Chapman evidently takes the same view of the use of the capsule.—Horace Donisthorpe, F.Z.S., F.E.S., South Kensington.

Coleoptera at Chiddingfold.—Having run down to Chiddingfold for a night on June 16th, I took the opportunity to visit my *Quedius kraatzii* stream, although it was later than I have taken the beetle before. It was evidently nearly over as only one or two specimens were seen, I took a fine male, however. Other species were *Deinopsis erosa* and *Platambus maculatus*, a very variable series of the latter being taken. I noticed a specimen of *Drusilla canaliculata* in the porch of the cottage where I stayed, which was running about with something in its mouth; this proved to be the dead body of an ant, and is very interesting as pointing out what its food may be and why it often occurs with ants.—Ibid.

Coleoptera in the Colchester district.—The best things taken here during the past month or two are *Gnorimus nobilis* (one on hawthorn), *Conopalpus testaceus*, *Orsodacna lineola* (casually when after lepidopterous larvæ), *Neuraphes angulatus* (one), *Cryptocephalus 6-punctatus*, *C. lineola*, *Harpalus subulicola*, *Haplocnemus nigricornis* (one beaten from Scotch fir), *Telephorus fuscus*, and *T. lateralis*, and *Aleochara lata*. *Quedius brevis* and *Amphotis marginata* (two), with *Lasius fuliginosus*. I have not seen *Hister marginatus* this year, but my brother took one running on a pathway in a wood near here.—Bernard Smith Harwood, Colchester.

Coleoptera at Dover.—Mr. H. Douglas Stockwell, a Dover lepidopterist, has just sent me (for examination) a few Coleoptera he has come across in that neighbourhood. They were as follows: *Carabus nemoralis*, Müll., *C. monilis*, F., *Toxotus meridianus*, Panz., *Clythra quadripunctata*, L., *Pyrochroa serraticornis*, Scop., and *Molytes germanus*, L. The last is a very local and usually rare insect and is our finest weevil.—T. Hudson Beare, B.Sc., F.E.S., King's Road, Richmond.

Notes from the Hastings district.—On April 1st and 2nd I had two days' collecting in this district with Mr. Donisthorpe and Mr. Bennett. On account of the long spell of dry, cold, north-east winds, everything was very backward, and beetles were exceedingly scarce, and it required very hard working to secure anything at all—what we did get, however, was good. On the 1st we cycled to Winchilsea and back; under flood refuse and under decaying reeds in the ditches we obtained, amongst other things, *Oodes helopioides*, F., *Anchomenus puellus*, Dj., *Conurus immaculatus*, Steph., and *Quedius scintillans*, Gr.; on the way back, at Guestling Wood, out of moss we got *Atemeles emarginatus*, Pk. (? with *A. fusca*), *Cacnopsis fissirostris*, Walt., and *Plinthus caliginosus*, F., while *Cryphalus fagi*, Fab., were dug out of a small beech bough. The next day was devoted to a visit to the stream at Bodle Street (just outside the limits of the Hastings' district) here again insects were extraordinarily scarce, but we got most of the specialities—the water-net, however, had to be used very vigorously before this result was secured—including, *Dromeetes 12-pustulatus*, Ol., and *latus*, Steph., *Hydroporus lepidus*, Ol., *Hydraena pulchella*, Germ., *riparia*, Kuy., and *nigrita*, Germ.. *Potamonus substriatus*, Müll., and *Elmis rolkmari*, Pz. In May I had another day in the district with Mr. Bennett. I went down on the afternoon of May 19th, and before evening secured a fine series of *Tachys bistriatus*, Duft., under stones, at Ecclesbourne reservoir. The evening was devoted to watching the wonderful popular outburst of joy at the relief of Mafeking, a sight never to be forgotten. On the 20th we cycled to Winchilsea and then on to Rye and Camber, returning direct from the latter place to Hastings in the early evening. I was exceedingly lucky in having a most beautiful day, and in securing many species new to me. At roots of grass at the side of a ditch at Winchilsea, *Panagaeus crux-major*, L., *Badister unipustulatus*, Bon., and *B. pellatus*, Pz. (this in profusion), and *Oodes helopioides*, F., were found. At Rye, in the old locality, on the banks of a ditch, *Bledius crassicollis*, Lac., was taken, and along with it *Dolichaster dichrous*, Gr., *Bagous tempestivus*, Hbst., and *Tanysphyrus lemnae*, F., the two latter in plenty. At Camber a week earlier Mr. Bennett had turned up two very local insects, and these we again secured, one was *Bidessus unistriatus*, Schr., found sparingly in the

clear shallow water near the edges of the ponds; the other was *Bembidium fumigatum*, Duft., this latter was quite common; I have only once before taken it (sparingly) at Dagenham, in Essex; these two insects were new records for the district. With *B. fumigatum* occurred *B. varium*, Ol., and *B. tricolor*, Bedel, and also *Anchomenus puellus*, Dj., in the utmost profusion; the water-net brought up *Coelambus parallelogrammus*, Ah., *Berosus spinosus*, Ster., and *B. affinis*, Brull. But to our disgust only one specimen of *B. spinosus* was secured. Working the refuse round the edge of the ponds we obtained *Bagous frit*, Hbst., *Eubrychius velutus*, Beck., and *Litodactylus leucogaster*, Marsh. Sluicing the mud by the side of a ditch secured a fine series of *Heterocerus fusculus*, Kies. A most successful day was finished up by securing that very local insect *Ptinus germanus*, F., in rotten timber fences.—Ibid.

Omophlus armeriae, Curt., at Weymouth.—After a few seasons' unsuccessful search, perseverance was rewarded, and I am pleased to record the rediscovery of *Omophlus armeriae* in this district. I was able to take this very local and rare insect in some numbers. It is noteworthy how considerably the males predominated over the females in number.—A. Forsyth, 20, Ranelagh Road, Weymouth.

ORTHOPTERA.

A few Orthoptera from Northern Persia.—In 1897 Miss Chawner, of Lyndhurst, very kindly gave me a small collection of Orthoptera, captured by Miss Sykes at Kermanbalk, in northern Persia. All the specimens come from the same locality. The collection works out as follows:—Forficularia.—*Anechura bipunctata*, Fabr.—One ♀. This species is found in all the mountains of central and southern Europe, sometimes at a great elevation, and extends as far east as Samarkand and Kashmir. Blattodea.—*Periplaneta tartara*, Sauss.—The original description is in Russian, and consequently I have some hesitation in definitely referring the three specimens to this species. It has been previously captured at Askabad (Redt.) and Kokan, in Turkestan (Sauss.). *Heterogamia aegyptiaca*, Linn.—One ♀. This species is widely distributed through eastern Europe and western Asia. Mantodea.—*Iris oratoria*, L.—One ♀. Acridiodea.—*Truxalidae. Epacromia thalassina*, Fabr.—One ♀. *Stauronotus maroccanus*, Thunb. Two ♀s. In spite of its name, this species is common in the Mediterranean subregion; it is *S. maroccanus*, which caused such damage in Cyprus, and led to energetic measures being taken for its extermination. *Oedipodidae. Oedipoda gratiosa*, Serv.—One ♂, one ♀. This beautiful species is common and widely distributed in Asia Minor, Persia and Turkestan. *Sphingonotus satrapes*, Sauss.—One ♂; previously recorded from Turkestan (Redt., Sauss.) and Persia (Sauss.), and also from Seir, in north-western Persia, where it was taken by Mr. R. T. Günther (Burr, *Linn. Soc. Journ. Zool.*, xxvii., p. 417. 1899). *Acrididae. Acridium aegyptium*, L.—One ♂. *Schistocerca peregrina*, Oliv. Two ♂ ♂, two larvæ. This species has a very wide distribution. It infests northern Africa, and also the north-west provinces of India. *Pamphagidae. Tropidauchen securicolle*, Sauss.—One ♀. This is quite the most interesting specimen of the collection. It is somewhat smaller than the type of de Saussure, and the pronotum has the crest less strongly arched, and it approaches more nearly to

T. cultricolle, Sauss., but it differs so distinctly in the form of the prosternal spine, with which it agrees entirely with *T. securicolle*, that it is to the latter species that I refer it. De Saussure gives the length of body of the female as 58mm., and of the pronotum as 25mm., but in the specimen before me, the body is only 46mm., and the pronotum 14mm., which are about the dimensions of *T. securicolle*. It may possibly be a new species, falling between these two, but I do not wish to base a novelty upon a single female. *T. securicolle* has been recorded from Syria, and *T. cultricolle* from Turkestan, Aschabad. Locustodea.—*Locustidae*. *Locusta caudata*, Charp.—One ♀ ; common in south-eastern Europe and south-western Asia. Gryllodea.—*Gryllus desertus*, Pall.—One ♂ , one ♀ ; recorded from Asia Minor and Turkestan. Common in south-eastern Europe. *Gryllus frontallis*, Fieb.—One ♀ . Common in south-eastern Europe, and also recorded from Syria and Turkestan. *Gryllus domesticus*, L.—Two ♀s.—M. Burr, F.Z.S., F.E.S.

SCIENTIFIC NOTES.

The multiplication of identical specific names within the same family.—I should like to say a word as to the multiplication of identical specific names within the same family. The rule no doubt stands that the same specific name must not occur twice in the same genus, but this rule originates in reference not to our present genera, but to Linnean genera, that is, we may say to superfamilies, when applied to the lepidoptera. Amongst the Lithosians mentioned by Sir George Hampson in the second volume of his *Catalogue*, there are more than 30 instances of names being repeated in the first half of the alphabet; often the same name is repeated several times as, *bicolor* (3), *caerulescens* (4), *fasciata* (6), *grisea* (4), &c. The author is as frequently responsible for these repetitions as any one else. No doubt he does this in good and numerous company. I nevertheless consider that it is wrong, and that some of the care insisted on not to repeat generic names should be applied to specific names within wider limits than are now recognised. It seems to be utterly forgotten that the species is in some degree a natural entity, whilst the genus is much more a matter of opinion and convenience, not to say caprice. It is a label of classification, whilst the specific name distinguishes an actual separate thing.—T. A. Chapman, M.D., F.Z.S., F.E.S., Betula, Reigate.

The types of the genera Gortyna and Ochria.—I have just discovered, too late for use in the "London Fauna List" of the City of London Entomological Society, that Professor Grote, in fixing *micacea* as the type of *Gortyna* (*Ent. Record*, vi., p. 29) has overlooked one authority, whose action fortunately enables us to retain the familiar use of this name and of *Hydroecia*, Gn. Samouelle (*Entom. Compend.*, p. 252 [1819]) indicates *flavago* (*ochracea*, Hb.) and *rutilago* (*umbra*, Hfn.) as types of *Gortyna*, while Hübner's restriction to *micacea* can hardly date back further than 1822 (the portion of the "Zuträge" published in 1822, is cited freely in this portion of the "Verzeichniss"). Therefore Samouelle's action has priority, and the further restriction of later authors to *ochracea* is perfectly legitimate. As regards the name *Ochria*, used by Professor Grote for

ochracea, its type (according to Merton Rule 48) is *aurago*, Fb., as its *first* use by Stephens in his 1850 list (p. 125) is for subgenus *c* of *Xanthia* (*aurago* alone). As it is not yet proved that *aurago* is congeneric with *citrago*, L. (personally I have very grave doubts as to this union), we shall do well to use (provisionally) the name *Ochria* for *aurago* and to retain *Tiliacea*, Tutt, for *citrago*, and not to sink *Tiliacea* before *Ochria* until further information is available.—Louis B. Prout, F.E.S., 246, Richmond Road, N.E. *July 6th*, 1900.

Cross-pairing of Smerinthus populi and S. ocellatus.—I tried this season the experiment of cross-pairing *S. populi* and *S. ocellatus*. I had no trouble to get them to pair as they copulated freely when a ♂ and ♀ were isolated. Three females laid about 500 ova, but not a single one hatched.—H. Alderson, F.E.S., Hilda Vale Road, Farnborough. *July*, 30*th*, 1900.

VARIATION.

Black aberration of Xylophasia monoglypha (polyodon) at Ely.—It may be worth recording that last night, while sugaring here, I took *Xylophasia monoglypha* (*polyodon*) quite black. I thought these aberrations were only taken in Scotland. Has it ever been recorded for the eastern counties before?—W. J. Cross, Ely. *July 6th*, 1900.

[In *British Noctuæ and their Varieties*, vol. i., p. 74, a few southern localities are given for ab. *infuscata*, White, including Tenby, Sheerness and Deal. The ab. *aethiops*, Staud., has been recorded from Sligo, the Lancashire coast, Glasgow and Aberdeen, but from no more southern localities. We may add that our knowledge as to the causes of certain forms of variation are much hampered by want of records of the distribution of various forms of common or comparatively common species, and until our collectors have determined the geographical range of the various forms, generalisations bearing on their origin are almost sure to be at fault.—Ed.]

Gynandromorphous example of Dryas paphia.—A fine specimen of *Dryas paphia*, which was captured near Lyndhurst, New Forest, on July 28th, seems to be worth recording. The right wings are those of a ♀ var. *valesina*, the left wings ordinary type of ♂ with the exception of a dark splash resembling *valesina*-colouring on the forewing. I should be pleased to learn whether this peculiar form of gynandromorphism has ever occurred before. The specimen is now in my cabinet.—W. F. Urwick, 31, Great Tower Street, London. *August 17th*, 1900. For similar aberrations see Wiskott, *Die Lepidopteren-Zwitter seiner Sammlung*, pp. 17, 18, where two are recorded left wings ♀ ab. *valesina*, right wings ♂ typical *paphia*. There are also we believe some British records.—Ed.

Aberration of Arctia caia.—I bred this year a very fine aberration of *Arctia caia* from a wild larva collected with many others a few miles from here. The forewings are entirely dark brown with the exception of four minute white streaks near the base, the hindwings and body are nearly black, the usual red of the remaining ground colour being replaced by a dull ochreous-yellow. The specimen emerged on July 13th, and is a female, rather undersized, but perfect.—B. H. Crabtree, F.E.S., The Acacias, Levenshulme, Manchester. *August 18th*, 1900.

Aberrations of Calymnia affinis and Xylophasia polyodon.—I took a nice specimen of *C. affinis* a night or two ago, without the usual white marks. I also captured the first black *Xylophasia polyodon* I have ever taken near this town, I got it in my garden. It will be interesting to note if the number of the black aberrations increases, as I generally see 500-1000 of the ordinary form at sugar every year.—R. Freer, M.D., F.E.S., Rugeley, Staffs. *July, 29th*, 1900.

NOTES ON COLLECTING, Etc.

Colias edusa and C. hyale in 1900.—A single female of *C. edusa* was seen at Reigate, June 11th. Subsequently I netted three females from south Devon (near Salcombe) on July 13th, 14th. One of these was almost unrecognisably wasted, died soon after capture, with only a very few ova left in her abdomen. The other two specimens were fresh-looking examples, one of which laid eggs freely, when confined over clover, which hatched in six days, previously changing in colour from straw to scarlet and subsequently to leaden-coloured, just before hatching. These early summer appearances, especially the Surrey examples, may perhaps be the heralds of an abundant second appearance in August. On the south Devon coast early examples of *C. edusa* are not infrequent, in some years, but my only record for 1899 was one male specimen, near Dartmouth, June 28th. —R. M. Prideaux, Reigate, Surrey. *July 24th*, 1900.

Colias edusa was seen careering at a rare pace through Hither Green railway station about 11 a.m. on July 27th. Another was seen in the street just outside the station.—J. W. Tutt.

My son caught a fine specimen of *Colias edusa* in a clover field here on the 14th inst., also two rather worn specimens of *Pyrameis cardui*. —A. H. Rydon, Awbrook, Lindfield, Sussex. *August 15th*, 1900.

It may interest lepidopterists who are following the reports of the above insects to know that on August 19th, in a fallow field in the Croydon district, *C. hyale* was flying very commonly. I captured fifteen specimens, and eight more were seen. They were flying at the flowers of ragwort and thistle. *Colias edusa* also put in an appearance during the day, four being taken and about eight observed; these, curiously enough, were all males. Most of the specimens appeared to be only just emerged, though occasionally worn ones of both species were met with.—E. W. Lane, 9, Teesdale Street, Hackney Road, London, N.E. *August 22nd*, 1900.

On August 12th I had the pleasure of netting two fresh specimens of our great rarity *Colias hyale* at Addington, and hope this is a new locality for the insect. The next fourteen days or more should be accountable to me for a few more specimens. *Colias edusa* at the same time was flying about in good numbers. Apparently the time has come round again for this insect to be common among us.—C. B. Antram, 54, Elgin Road, Croydon. *August 14th*, 1900.

I took three specimens of *Colias edusa* at St. Anne's-on-Sea on August 15th (one male and two females) and saw several others. They were flying over ragwort flowers close to the sea. I had one or two good nights at ragwort flowers with the Agrotids, *Agrotis cursoria* being particularly fine, variable, and abundant.—B. H. Crabtree, F.E.S., The Acacias, Levenshulme, Manchester. *August 18th*, 1900.

Walking across Blackheath on Monday afternoon, the 13th inst., a fine female *Colias edusa* crossed my path.—W. West, 8, Morden Hill, Lewisham Road. *August 15th*, 1900.

Sugaring in the Isle of Man.—I have sugared the trees in this garden almost nightly for the past three weeks. Insects have been very scarce, and the following are the only species which turned up at the sweets. *Triaena psi* (two), *Leucania comma*, *L. pallens*, *L. impura*, *Axylia putris* (three), *Xylophasia monoglypha* (light, dark and intermediate forms, some almost black), *Mamestra brassicae*, *Apamea gemina*, *Miana strigilis*, *Agrotis exclamationis*, *Noctua plecta*, *N. festiva*, *Triphaena orbona*, *T. pronuba*, *Naenia typica* (one), *Mania maura*, *Euplexia lucipara* and *Phlogophora meticulosa*. Throughout June and the first fortnight of July flowers proved very attractive to certain species, amongst those which occurred in numbers at red valerian were *Choerocampa porcellus*, *Habrostola triplasia*, *H. urticae*, *Plusia gamma*, *P. iota*, *P. pulchrina*, *P. festucae*, *P. chrysitis*, and *Cucullia umbratica*.—H. Shortridge Clarke, F.E.S., Sulby Parsonage, Isle of Man. *July 30th*, 1900.

Notes from Hailsham and Abbott's Wood.—A week spent at Hailsham (June 23rd-July 1st) produced good results among the lepidoptera. Among the butterflies one or two worn specimens of *Gonepteryx rhamni* were still on the wing, and a few *Pieris napi* and one male *Euchloë cardamines* were noticed. *Argynnis aglaia* was just coming out towards the end of our stay, and the two specimens taken were in beautiful condition. One specimen of *Brenthis euphrosyne* and two *B. selene* were netted, all more or less worn. *Melitaea athalia* was not uncommon in two localities in the neighbourhood of *Melampyrum pratense*, and most of the specimens taken were in good condition. An occasional *Aglais urticae* was met with and a few *Pyrameis atalanta* were also noticed. *Epinephele janira* and *Coenonympha pamphilus* vied with each other for the proud distinction of being the commonest butterfly. *Polyommatus icarus* and *P. astrarche* were both noticed in very bad condition, and as may be imagined, a single example of *Callophrys rubi* was no better. *Pamphila sylvanus*, which was common and in good condition, completes the list of Rhopalocera noticed. Day work among the moths was fairly good. A single specimen of *Macroglossa fuciformis* was taken at the flowers of the cow-wheat. Three females of *Cochlidion limacodes* were beaten from oak, beech and hornbeam, and a single freshly emerged *Calligenia miniata* from hazel. A few *Lithosia sororcula* (*aureola*) were beaten from oak, but they were a bit "off colour"—they did not fall or flutter down like many of the "footmen," but flew straight out. A female *Arctia villica* was found on the top of a thorn hedge and a fine male of the same species was disturbed from bracken. The Geometrids noticed were *Rumia crataegata*, *Venilia maculata* (faded), *Metrocampa margaritaria* (very abundant), *Eurymene dolabraria* (a few), *Boarmia repandata*, *B. roboraria* (a much worn male), *Tephrosia extersaria* (a few, mostly worn), *Iodis lactearia* (very common), *Phorodesma bajularia* (one, fine), *Hemithea thymiaria* (scarcely out), *Ephyra porata* and *E. punctaria* (both common, but worn), *Asthena luteata* (a few), *A. candidata*, *Eupisteria heparata* (among alders, very local), *Acidalia trigeminata* (three), *A. aversata* (common), *Cabera pusaria* (very abundant), *C. exanthemaria*, *Lomaspilis marginata*, *Larentia pectinitaria* (very bad), *Melanthia ocellata*, *Melanippe unangulata* (one, very fine), *M. subtristata*,

M. montanata, *Camptogramma bilineata*, *Eucosmia undulata* (one), *Cidaria corylata* (a few worn specimens), *Tanagra atrata* (local, but very common where found). Of the Deltoides a few *Zanclognatha grisealis* were taken, whilst *Pechypogon barbalis* was common but worn out. Among the Pyralides, *Hydrocampa nymphæata* was common in the neighbourhood of ponds, two specimens of *Botys fuscalis* were netted, and single examples of *B. lancealis* and *Aglossa pinguinalis* were also taken. Dusking produced *Hepialus hectus* in plenty, one *Calligenia miniata*, one *Drepana falcataria*, a fair number of *Angerona prunaria* (males) which began to fly very early—before sunset in fact, among about a score of specimens netted the variation was considerable- and single examples of *Phorodesma bajularia*, *Acidalia marginepunctata*, *A. trigeminata*, *Eupisteria heparata*, *Macaria notata* and *Rivula sericealis*, also a number of common insects noted under day-work. In the hedges, when coming home during the evening, *Xylophasia polyodon*, *Rusina tenebrosa*, *Noctua festiva* and *Rumia cratægata* were all to be seen commonly. Treacling was only moderate, but a few nice things were taken :—*Choerocampa elpenor* (one), *Gonophora derasa* (a few), *Cymatophora duplaris* (two), *C. or* (about a dozen), *Moma orion* (three), *Triæna* (*? psi* or *tridens*), *Craniophora ligustri* (three), *Leucania comma*, *L. pallens*, *L. impura*, *Xylophasia lithoxylea*, *X. polyodon* (a pest), *X. hepatica* (a few), *Dipterygia pinastri* (one), *Mamestra anceps* (a few), *Miana strigilis*, *M. fasciuncula* (one only), *Grammesia trigrammica* (very few), *Caradrina morpheus*, *Rusina tenebrosa*, *Agrotis segetum*, *A. exclamationis* (by far the commonest moth at treacle), *A. corticea* (four), *Triphæna pronuba* (common), *Noctua plecta* (one), *N. triangulum* (two), *N. brunnea* (two), *N. festiva* (common and varied), *Dianthœcia cucubali* (one), *Phlogophora meticulosa*, *Euplexia lucipara* (one), *Aplecta nebulosa*, *Hadena dentina*, *H. oleracea*, *H. thalassina* (two), *Eurymene dolabraria* (two), *Tephrosia extersaria*, *Boarmia repandata*, *Metrocampa margaritaria*, *Cabera pusaria*, *Iodis lactearia*, *Ephyra pendularia* (two, worn), *E. porata* (worn), *Acidalia aversata*, *A. trigeminata*, *Camptogramma bilineata*, *Lomaspilis marginata* and *Pechypogon barbalis* (worn). Indoors the light attracted *Sphinx ligustri* (one), *Cerura vinula* (one), *Spilosoma menthastri*, *S. lubricipeda*, *Grammesia trigrammica*, *Caradrina morpheus*, *C. blanda* (? or *alsines*), *Agrotis exclamationis*, *Noctua festiva*, *Leucania pallens*, *Timandra amataria*, *Camptogramma bilineata*, *Coremia* (*? ferrugata*) and *Larentia pectinataria* (worn). The following larvæ were taken :—*Gonepteryx rhamni* (from very small to full-grown), *Aglais urticæ*, *Lasiocampa quercus* (three), *Malacosoma neustria* (abundant), *Lachneis lanestris* (ten odd larvæ, no nests), *Trichiura cratægi* (two), *Porthesia chrysorrhœa* (one), *P. similis* (abundant), *Arctia caia*, *Cerura vinula* (from freshly emerged to full grown, also ova), *Drymonia chaonia* (two), *Asphalia ridens* (two), *A. flavicornis* (five), *Amphidasys prodromaria* (about a dozen), *Abraxas grossulariata*, various Hybernias, *Anticlea derivata* and *A. badiata* (about half a dozen of each), *Anisopteryx æscularia*, *Taeniocampa stabilis* (very common), *T. instabilis*, *T. gothica*, *Anchocelis pistacina*, *Diloba cæruleocephala*, whilst *Ebulea crocealis* was common in spun-together heads of *Pulicaria dysenterica*. Odonata were, I am sorry to say, neglected—the Sussex marshes towards Pevensey are always swarming with dragonflies. The following species were, however, noticed :—*Ischnura elegans*, *Pyrrhosoma nymphula*, *Agrion puella* (very common), *Anax*

imperator (three), *Libellula depressa*, *L. quadrimaculata*, *Platycnemis pennipes* and *Brachytron pratense*.—F. M. B. Carr, 46, Handen Road, Lee, S.E. *August 21st*, 1900.

Lepidoptera captured during July.—On July 14th, I took a trip to Oxshott, the following being a list of insects taken: *Plebeius aegon* just coming out, *Fidonia atomaria* (in good condition), *Euthemonia russula*, *Gnophos obscurata*, (one only of each species). Towards evening *Lycophotia strigula* (*porphyrea*) came out, and in nice condition, also *Lithosia mesomella*. On July 18th I went in the evening to Stoke Wood, Oxshott. Treacle was a failure, although plenty of insects were on the wing. The commonest being *Hypsipetes elutata*, flying at about 10 o'clock. *Angerona prunaria*, some six specimens taken, others somewhat worn, *Selenia illustraria*, *Porthesia similis*, *Cropteryx sambucata*, *Zonosoma pendularia*, *Hemithea thymiaria* and *Phorodesma bajularia*, both species worn. On July 21st the afternoon was spent at Oxshott. *Plebeius aegon* was now fully out, plenty of females being observed. I walked to Stoke Wood, where I found *Epinephele tithonus* and *Enodia hyperanthus* just out, one specimen of *Argynnis adippe*, *Gonepteryx rhamni*, larvæ of *Euchelia jacobaeae* everywhere, whilst *L. strigula* (*porphyrea*) and *Lithosia mesomella* were taken on the heath in the evening. On July 28th *P. aegon* was quite *passé*, and *E. tithonus* and *E. hyperanthus* worn; *Zephyrus quercus* was flying round the tops of oaks in Stoke Wood, four, five and six being visible at a time. On the heath in the evening *L. strigula* was worn, one faded *Geometra papilionaria*, and three faded *Pseudoterpna cytisaria* were netted, one *Drepana lacertula*, one *D. falcula*, two *Cilix spinula*, *Gnophos obscurata* and *Acidalia aversata*. Larvæ of *Smerinthus ocellatus* and *Cerura vinula* about half-fed, on sallow, were found on the outskirts of Stoke Wood. It is a fine wood and well worth a visit. I may add that my hybrid ova (*ante*., pp. 215-6) all went wrong. Not one hatched.—C. P. Pickett, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *July 30th*, 1900.

Hemerobius nitidulus at York.—Among some Neuroptera, &c., sent me alive by Mr. William Hewett, and taken by him at Sandburn, York, on May 14th last, were a good number of *Hemerobius nitidulus*. It is probably common enough, but has not previously been recorded from East Yorkshire, Mr. B. Morley, too, sent me a number of the apparently local *Stenophylax ribex*, which he took at Skelmanthorpe, Huddersfield, in the spring of this year.—Geo. T. Porritt, F.L.S., F.E.S., Crosland Hall, Huddersfield. *August 11th*, 1900.

Acronycta ligustri and Eupithecia fraxinata in north Yorkshire.—Having several hours to wait at Leyburn, on my way to Arkengarthdale, on August 4th last, I strolled down the road between that place and Middleham. I soon found that larvæ of *Eupithecia fraxinata* and *Acronycta ligustri* were plentiful on the ash-trees by the roadsides, and as ash seemed to be the prevailing tree for many miles all over the district, probably these two species would be found to be common throughout it. Both were readily found without the aid of a beating-stick on the small trees and the young growth which is so often found springing from the base of the large trees. No doubt the *A. ligustri* will prove to be of the dark olive form which occurs in other parts of Yorkshire. As practically nothing seems to be known of the entomology of that part of our large county it may be worth

while to place the foregoing on record; also to add that the lively *Triphaena janthina* occurred about the ivy on the ash-trunks.—Ibid.

Notodonta chaonia and N. dodonæa near Croydon.—I have bred one *Notodonta chaonia* and three *N. dodonæa* from larvæ taken last year at Farley, near Croydon. I also took the imago of the latter species at rest on a tree-trunk this year. Is not this a new locality for *N. chaonia*? perhaps also for the more common of the two species, *N. dodonæa*?—C. B. Antram, Croydon. *August 13th*, 1900.

Forcing Callimorpha hera.—Following up my notes on the "Forcing of *Callimorpha hera*" (*ante*., p. 130), April 7th, saw the last of the larvæ change into the pupal stage, the first imago appearing on May 3rd. For about three weeks the perfect insects continued to emerge in twos and threes per diem; quite 50 per cent., however, of the pupæ failed to produce imagines, owing I am afraid to my having kept them too dry, and there was also a fair number of cripples: 20 per cent. were of the yellow aberration, and out of forty specimens only two were of the intermediate form.—Ibid.

Finding larvæ of Cœrocampa porcellus by lamplight.—On July 31st, my friend Mr. E. Field and myself started at dusk to go to the village of Cherryhinton to look for the larvæ of *Choerocampa porcellus* by lamplight. After a brisk walk we reached our destination, and having lit our lamps we set to work upon the piles of *Galium verum*. Some little time had been spent in a fruitless search, when my friend found a larva of at least three inches in length, and after that we kept on finding them at varying intervals, the majority having brown skins, but a few with green ones. At eleven o'clock we struck work, and on counting our captives we found the united take of larvæ to be forty *C. porcellus*, three *Macroglossa stellatarum* and two *Anticlea sinuata*.—E. Crisp, 31 Union Road, Cambridge.

Smerinthus ocellatus and Cerura vinula two years in the pupal stage.—Referring to Mr. Lane's note (*ante*., p. 217) on *Smerinthus ocellatus* being two years in the pupal stage, I can instance a similar case. On June 11th, 1898, I took eight eggs of *S. ocellatus* at Hythe, Kent, which produced imagines in June 1899, except one, which remained over the second winter in pupa and emerged on May 29th last, in fine condition. A similar thing happened also with a specimen of *Cerura vinula* which emerged early this spring from a pupa bred from an egg found with others (which produced their imagines in due course in 1899), on the banks of the Thames at Barnes, on July 6th, 1898.—H. Ainslie Hill, F.Z.S., F.E.S., 9, Addison Mansions, Kensington, W. *August 1st*, 1900.

Deilephila livornica in the Isle of Man.—On the evening of the 11th inst. a specimen of *D. livornica* was seen by Mr. William Garrett, of Douglas, hovering over flowers of *Silene maritima* in the same locality where several were seen and captured last year, as recorded in the *Ent. Record*, vol. xi., p. 166.—H. Shortridge Clarke, F.E.S., Sulby Parsonage, Lezayre, Isle of Man. *July 16th*, 1900.

Plusia iota on the wing during the day.—I noticed a number of *Plusia iota* flying about in the garden to-day about 12 o'clock noon, some of which I caught whilst hovering over flowers of blue lobelia which are now in bloom. Is this usual? The sun was shining brightly at the time. I have frequently seen specimens of *Plusia gamma* flying over flowers in the sunshine, but never *P. iota*.—Ibid.

Macroglossa stellatarum in the Isle on Man.—*Macroglossa stellatarum* is very plentiful here at present. I saw ten specimens one evening last week hovering over flowers of red valerian in this garden. —Ibid.

Hipparchia semele at treacle.—It may be of some interest to your readers to record the capture of two specimens of *Hipparchia semele*, on July 25th and 29th, in a treacle trap I have hanging up in my carriage drive, whilst on August 15th a third example was caught in the same manner. Strange to say I have not this year yet seen a single specimen in the fields. Is the taste of *H. semele* for sweets generally known? On August 2nd I caught, in the same trap, a fine specimen of *Eugonia polychloros* and numerous examples of *Pyrameis atalanta*. This has been a great year for *Aglais urticae*, and *Vanessa io* has been seen here for the first time in some abundance. For moths, treacle and light have, as usual in this district, failed.—A. H. Rydon, Awbrook, Lindfield, Sussex. *August 15th*, 1900.

Food-plants of Cucullia lychnitis.—I am rearing a number of larvæ of *C. lychnitis*, taken off *Verbascum nigrum* in Sussex, and I find they take readily to and do well on both *Verbascum thapsus* and *Scrophularia aquatica*.—Percy C. Reid, F.E.S., Feering Bury, Kelvedon. *August 11th*, 1900.

Lepidoptera at Farnborough.—On July 26th a female *Eutricha quercifolia* came indoors to light, the first example of the species that I have ever seen in this district. I placed her in a muslin sleeve and obtained a good supply of ova. A male *Stauropus fagi* was taken on a small birch in the wood near here, and some 500 yards from any beech tree that I know. I took *Pygaera curtula* larvæ last season on the aspens near, and have had about a dozen imagines emerge in my breeding-cage. I also captured a ♂ *Boarmia consortaria* on the fence here on June 20th, the species being quite new to the district.—H. Alderson, F.E.S., Hilda Vale Road, Farnborough. *July 30th*, 1900.

Lepidoptera in Anglesea.—Courtship of Hepialus humuli.—Pairing of Sesia musciformis.—I spent my holiday in Anglesea, and had atrocious weather. It might be a good place, but at the time sugar was absolutely of no use, and there was very little sun. I got, *inter alia*, *Sesia musciformis* (plentiful), *Plebeius aegon* (very common, I obtained some nice females), *Charicleа umbra*, *Pseudoterpna cytisaria*, *Hecatera serena*, *Dianthoecia conspersa*, *Mamestra albicolon*, *Eubolia palumbaria* (very fine and dark). I came across an amusing instance of the courtship of *Hepialus humuli*. A male was hovering, as usual, when a female flew close up to him, apparently saluting him, and then hung herself up on an adjacent grass-stalk. The male took no notice but went on hovering, and after waiting for about a minute the female left her perch and repeated the salutation, hanging herself up again; this time the male joined her and they paired. It would appear that *Sesia musciformis* chiefly fly from 11 a.m.-3 p.m., but I have seen odd ones, ♀ s, between 6 p.m. and 8 p.m. They pair about 12 (noon), and seem to remain paired for a short period, I was not able to actually time them. When these paired couples are disturbed the ♀ carries the ♂ and progresses in large hops or short flights exactly like a grasshopper, of which latter there was any quantity about, and I two or three times caught pairs which jumped on or into my net. They were easy enough to distinguish on the wing, flying steadily and not very fast. Insects appear

to be common here just now, and I am repenting not having taken my holiday later, but I had hoped to get *Dianthoecia* var. *barrettii*.—R. Freer, M.D., F.E.S., Rugeley, Staffs. *July 29th*, 1900.

Lepidoptera in Yorkshire.—I have just returned from the neighbourhood of Ingleborough, Yorks, where I have been for a short holiday, but have not much to report. The weather was very dull and cold for the greater part of the time (June 30th to July 11th) and butterflies conspicuous by their absence. The nettles everywhere—even high on the moors—were black with larvæ of *Aglais urticae*, and one or two worn specimens were seen on the wing. I had fair sport over beds of nettles at night, and took a nice series of *Habrostola triplasia*, *Xylophasia rurea* (typical form) *Apamea gemina*, and *Hepialus velleda*, in nice variety, at dusk. *Pyrausta purpuralis* were in fine condition near the top of Ingleborough, and two ♀ *Nemeophila plantaginis* were taken at rest. *Larentia caesiata* were abundant on the rocks and variable. A few specimens of *Nudaria mundana* were taken from walls near Malham. On June 8th, 17th, and 21st, I bred *Smerinthus ocellatus*, fed on crab (Chilwell), whilst on July 22nd and several following days *Macroglossa stellatarum* has been flying in my garden—a very early date for it here. I may mention that I took a number of larvæ of *Lasiocampa* var. *callunae* from the heather at Ribblehead, which are now feeding up on plum.—D. H. Pearson, Chilwell, Notts. *July 27th*, 1900.

Lepidoptera in the Southend district, 1900.—I cannot at present give my full list to date, but I have pleasure in contributing a few notes on the best insects observed. *Porthesia chrysorrhoea:* At Great Wakering, on May 13th, I found a nest of young larvæ on blackthorn. The moths emerged as follows: July 26th, 4 ♂ s, 1 ♀; July 27th, 2 ♂ s, 1 ♀; July 28th, 16 ♂ s, 12 ♀ s; July 29th, 9 ♂ s, 24 ♀ s; July 30th, 8 ♂ s, 6 ♀ s; July 31st, 3 ♂ s, 2 ♀ s; August 1st, 1 ♂, 1 ♀; August 2nd, 4 ♀ s; August 6th, 1 ♂, 1 ♀; August 10th, 1 ♀, and on August 23rd, 1 ♀. In all 44 ♂ s and 54 ♀ s. It is as long ago as June, 1876, that I last saw larvæ of this species. They were then abundant on hawthorn near the Canterbury Road close to the village of Herne. *Sesia ichneumoniformis:* This insect is reputed common in the Southend district. Being desirous of removing the reproach of not possessing an Essex specimen, I swept the *Lotus* on the slopes near here almost daily in July, until the eighth of the month, when I took my first; July 10th, another; July 13th, three. In sweeping for this Sesiid I was fortunate in getting several larvæ of *Eremobia ochroleuca* which I knew directly, having so often looked at the excellent figure in Buckler, vol. vi., plate 87, fig. 1. The moths emerged between July 25th and August 14th. *Cucullia asteris* came out well between July 12th and August 3rd, I feared that I had made a serious mistake in not exposing the pupæ to the weather (having kept them in the greenhouse all the winter); but I think from the number bred that every pupa must have yielded its moth. *Spilodes palealis* emerged July 17th-August 16th. Several taken in bred condition July 16th-25th. There is considerable variation in the darkening of the nervures at lower outer edge of cell, in a few specimens the interspaces are very dark the whole forming a blotch. Adult larvæ were found this year on July 29th, several of them showing the purplish colour described by Mr. Porritt *Entomologist*, vol. xii., p. 18. Mr. Herbert Williams, of Southend, obtained a few larvæ last year, but not breeding any moths opened a

cocoon and showed me on Saturday last, August 18th, the contents—a larva still alive. *Colias hyale* is here. The first was taken July 19th, in fine condition.—F. G. Whittle, 3 Marine Avenue, Southend, Essex. *August 24th*, 1900.

PRACTICAL HINTS.

Field Work for September and October.

By J. W. TUTT, F.E.S.

1.—In the third week in September the larvæ of *Notolophus gonostigma* may be beaten from oak and birch in Sherwood Forest (Porritt).

2.—In September *Calluna vulgaris* should be swept for larvæ of *Eupithecia minutata* and *E. nanata*.

3.—Ragwort bloom in September sometimes gives an abundance of imagines of *Noctua glareosa*.

4.—The larvæ of *Eupithecia subfulvata* are to be found on leaves and flowers of *Achillea millefolium* in September and October, and those of *Eupithecia trisignata* and *E. albipunctata* on seeds of *Angelica sylvestris* also in September and October.

5.—The larvæ of *Amphidasys betularia*, *Dasychira pudibunda*, *Notodonta camelina*, *Acronycta leporina*, &c., may be beaten from mixed growth in September.

6.—The larvæ of *Eupithecia satyrata* and *E. absynthiata* are to be found on flowers of *Senecio jacobæa* in September and October.

7.—The carpet-like layer of needles and moss at the foot of a pine-tree wants rolling back, when the pupæ of *Panolis piniperda* are readily found at about a foot from the tree (Norman).

8.—In September the larvæ of *Eupithecia assimilata* may be searched for on or beaten from hop.

9.—During October and November the most successful field work in suitable weather is undoubtedly pupa-digging. Those who prosecute this mode of work regularly usually get very gratifying results. At the same time work well under moss on trunks for cocoons spun up there. The ash-feeding larvæ are particularly fond of moss in which to spin up.

10.—Beating thatch always pays the Micro-collector in the autumn months; large numbers of local *Depressariæ* and other species are more readily obtained in this than in any other manner.

11.—The larva of *Emmelesia unifasciata* feeds on the capsules and seeds of *Bartsia odontites*. They are full-fed in September and early October.

12.—The larvæ of *Stigmonota rosaeticolana* should be collected in October when they are feeding in the rose-hips. Care should be taken to provide them with cork in which they can spin their cocoons.

N.B.—Hundreds of similar "Practical Hints" for each month in the year have been published in the preceding volumes.

CURRENT NOTES.

A very enjoyable meeting of the Entomological Club was held at the Great Eastern Hotel, Liverpool Street, E.C., on Thursday, July 19th, when Mr. G. T. Porritt, F.L.S., F.E.S., was the host. Dinner

was served at 7 p.m., and Messrs. R. Adkin, B. W. Adkin, C. G. Barrett, J. T. Carrington, F. J. Hanbury, J. Jäger, W. J. Lucas, R. McLachlan, R. South, J. W. Tutt, and G. H. Verrall were among the guests. Letters of regret were read from the members Dr. P. B. Mason and Mr. T. W. Hall for their absence on account of ill-health. The host proposed "The Entomological Club," dwelt on the fact that the meetings were to be considered rather social than scientific, and trusted that every one present would thoroughly enjoy himself. This the guests evidently did, indulging in informal chat and recounting many strange entomological reminiscences. One will never be able to estimate the value of these social evenings when opponents in discussion and men of entirely different lines of thought meet on common ground and forget their differences on the neutral plane such meetings afford.

The Yorkshire Naturalists' Union held another field meeting on August 4th and succeeding days in order to explore Arkengarthdale, a part of Swaledale. The headquarters were at Reeth, and at the meeting on Monday night, under the presidency of Mr. G. T. Porritt, F.L.S., F.E.S., three new members were elected, and reports of the work done were read. The wet weather prevented the entomologists from doing any very serious work.

Mr. Green observes (*Ent. Mo. Mag.*, August) that the gregarious larvæ of various species of *Centrotus* are assiduously attended by ants which emit a fluid from an extensile 3-segmented organ at the extremity of the body. When the insect is undisturbed, this organ is withdrawn into the large conical segment which apparently terminates the body, but is extruded immediately upon application by the attendant ants.

Mr. Gerald Strickland states (*Ent. Mo. Mag.*), that the rubber solution supplied for repairing pneumatic tyres is an excellent adhesive for fastening antennæ, wings, &c., on broken insects.

Mr. Claude Morley confirms (*Ent. Mo. Mag.*, August) the Braconid *Helcon annulicornis*, Nees, as British, having captured a ♀ specimen in Brantham Dale, Suffolk, on July 6th, 1899.

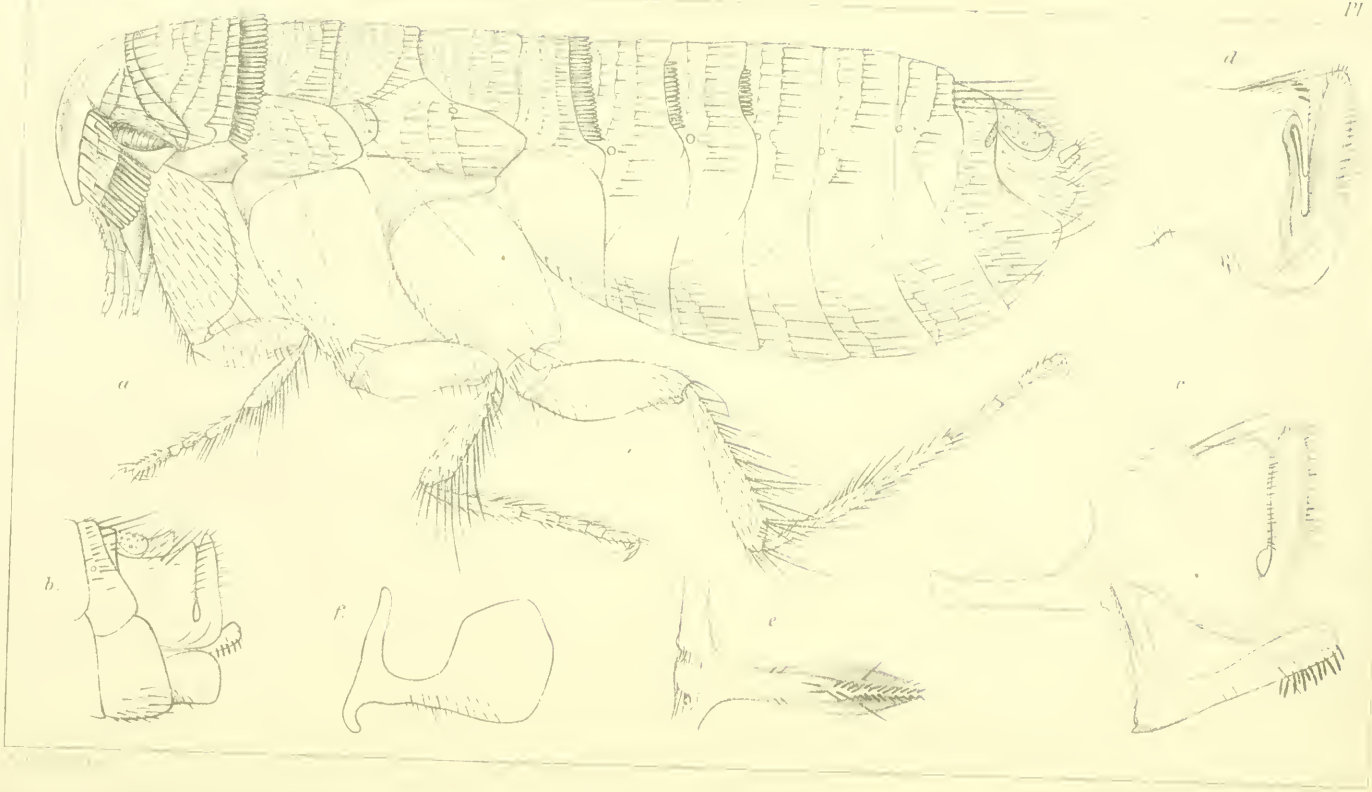
REVIEWS AND NOTICES OF BOOKS.

A Handbook of the Gnats or Mosquitoes, giving the anatomy and life-history of the Culicidae, by Major Geo. M. Giles, I.M.S., M.B. Lond., F.R.C.S. London: Bale Sons, and Danielson, 1900, pp. viii+374.—Good English works on Diptera are not too abundant, so that though the present work is intended chiefly for the use of those who wish to study gnats in connection with the whole subject of the causation and prevention of malaria and filariasis, its value to the naturalist is clear and definite. The book gives us first a series of chapters on the anatomy, life-history, and classification of the *Culicidae*, extending to 115 pp. The author does not say that he gives us here any original material, but we gather in looking through it, as well as from a definite statement to that effect, that he has gone over and verified the various facts collected from authorities quoted. These chapters should be useful not only to the investigator of tropical diseases, but to the ordinary entomological student. In the systematic

part of the work descriptions of 242 species are gathered together from various sources, and the author thinks that very few have escaped him. He is careful also to tell us that very possibly it will prove that some of these are not distinct, but are synonymous, due perhaps in some degree to carelessness of describers, more often to the insufficient description of earlier students. It might have been well had these been carefully elucidated by the author, but this would hardly have been possible, consistently with the aim of getting together at once all the material the author could find as a basis for further work, rather than providing a finished monograph of the group. If we regard it as what it proposes to be, a collection of the known material for the use of the student of medicine in the field, we must congratulate the author on having produced a work with such well digested arrangement. Of the 242 species, 72 are given as European and 24 as British. Of the latter several are genuine mosquitoes (*i.e.*, blood-sucking gnats), but our weather is rarely hot or dry enough to give them a taste for anything beyond their natural food of vegetable juices. It is for this reason that they are rarely very troublesome in this country, and not because the insects themselves are absent. We are inclined to suspect, however, that it is very much due also to the comparative rarity of the insects. One rarely sees *Culex pipiens*, or especially *C. annulatus*, without finding them ready to bite, but then they usually appear by ones and twos, and not in swarms.—T. A. C.

THE TRANSACTIONS OF THE CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, 1899, demy 8vo., pp. 1-80.—Price 2s. [Published at the Society's Rooms, London Institution, Finsbury Circus, E.C.].—The *Transactions of the City of London Entomological and Natural History Society* for 1899 consist of three parts: (1) The proceedings at the meetings, (2) Original papers, and (3) The continuation of the Fauna of the London District. The first part contains a large number of incidental notes and observations on the species exhibited by the members, most of them of great value, more particularly to field naturalists, whilst here and there (*e.g.*, p. 11, "The Coleoptera of Weymouth," Donisthorpe) one finds important abstracts of papers not printed in full. The papers in the second part are most valuable; "Notes on *Spilosoma lubricipeda*," by A. W. Mera; "Poisonous plants in relation to medical jurisprudence," by F. Bouskell, F.E.S.; "The lifehistory of *Oporabia autumnata*, Bkh.," by L. B. Prout, F.E.S.; "Variation in broods of *Axylia putris*, *Cucullia umbratica*, *Spilosoma urticae*, and *Malacosoma castrensis*," by A. Bacot; "Some marsh beetles of the Lea Valley," by F. B. Jennings, F.E.S. Mr. Prout's paper is particularly important to all lepidopterists, and no one should miss it who is at all interested in the Geometrids. "The Fauna of the London List," is carried on throughout the Noctuids, Deltoids and a part of the Geometrids. The nomenclature used will probably be to a large extent that finally accepted under the now generally recognised laws of priority, and we should be glad if correspondents would as far as possible keep entirely to the revised nomenclature as investigated by Mr. Prout and here published. The *Transactions* should certainly be in the hands of all lepidopterists.

ERRATUM.—p. 213, line 33, for 12mm. read 1·2mm.



Hystrichopsylla talpae

The Entomologist's Record AND JOURNAL OF VARIATION.

Vol. XII. No. 10. October 15th, 1900.

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

Besides the two species of Coliads (*C. edusa* and *C. hyale*) and *Pyrameis cardui*, to which reference has already been made, *Pieris daplidice*, *Argynnis lathonia* and *Euranessa antiopa*, also, can only be considered to be British species, so far as the immigrants themselves, and the direct progeny of these immigrants are, for the rest of the summer months directly following their arrival, able to exist here. The appearance of these species in this country is very uncertain, and their numbers always much fewer than those of the three first-named species, although in some years they are moderately abundant. It were perhaps useless to trace the years in which these species have occurred commonly in Britain. Generally, in such years, a few examples in the early summer are followed by an unusual abundance in autumn; suggesting that the former are the immigrants and the latter British-bred. At any rate these species exemplify well that particular group of insects that repeatedly become extinct in the higher temperate regions, and would never be seen in these districts were it not for the occasional influx of immigrants. Stephens, in 1835, noted (*Illus. Haust.*, i., p. 45) that "till about the middle of the last century few specimens of *E. antiopa* had been observed, but about 60 years since, it appeared in such prodigious numbers throughout the kingdom that the entomologists of that day gave it the name of the Grand Surprise. Of late it has again become infrequent; the last time that it occurred in plenty, according to Donovan, being in 1789 and 1803, a few only having been captured subsequently. At the present day (1835) it still appears to occur occasionally throughout England, as Mr. Backhouse informs me that it has been found repeatedly near Seaton, Durham, and often floating on the river Tees." Wailes, on the authority of Backhouse, states that "about 1820 he saw vast numbers of this species strewing the seashore at Seaton-Carew, both in a dead and living state." We may here point out that Hewitson notes (*Ent. Mo. Mag.*, ix., p. 161) that, on one occasion whilst crossing from Boulogne, he saw an example of this species midway in the Channel. In the year 1819 it was specially common in Durham and Suffolk, and in 1846 in all the eastern and southern counties from Hampshire to Yorkshire and also in Ayrshire; it was not uncommon in 1859-1860, but the greatest year for this species was 1872, when some hundreds were taken, its range extending, on this occasion, from Southsea and Dover to

Forres in Morayshire, and it occurred as late as November 4th at Weybridge, a few hybernators reappearing in the following spring, although they evidently failed to perpetuate their race here. In the same year (1872) the species occurred in extraordinary numbers in Holland (*Ent. Mo. Mag.*, x., p. 20) where the insect is usually scarce, and there is no doubt that the simultaneous abundance in Holland and Britain was due to the same cause. Stainton considered that the species migrated from the Continent *viâ* Scandinavia, other entomologists suggested that they came *viâ* Holland, but no direct evidence was forthcoming as to the course taken by the migrants. We know the species was common in Holland, was it also common in Scandinavia? One would suspect that the Dutch and British immigrants belonged to the same flight, whether that flight came from the north, or south, or east. The species was rather common again in 1880, a few in 1889 and 1900, but in other years only single examples have been recorded.

Apart from the butterflies which are regularly exterminated here by conditions, of which, at present, we have no real knowledge, there are others, which, regular inhabitants of our islands, have at irregular periods, their numbers greatly increased by immigration. Such are the two common species, *Pieris rapae* and *P. brassicae*, of which many flocks have been observed when on their migration journeys. We have ourselves seen *Pieris brassicae* (1887) come inland over the Straits of Dover in vast swarms, extending along the coast from Deal to the South Foreland. Other observers have witnessed similar occurrences on the Sussex, Lincoln and Norfolk coasts. The arrival of one of these migrating bodies is very characteristic of most. One sees at first a few butterflies coming towards, although at some distance from, the land, rising and falling, and occasionally even resting, upon the water. Soon the advance guard reaches the shore, whilst others rapidly come in. There seems never to be a crowd, or a very great number gathered together in a small space, but, like huge white snowflakes, they follow on continuously and without a break, and they are spread over a very considerable area. Many are in almost perfect condition, others considerably worn and often ragged. As soon as they arrive they appear to gather on almost every flower within a few hundred yards of the shore. The immigration we witnessed, however, soon dispersed inland, and, in the course of a few hours or so, very few remained in the immediate neighbourhood of the original landing-place. There are many interesting records of the observations made on *Pieris rapae* and *P. brassicae* when they have been actually crossing the sea. On July 5th, 1846, a large flight crossed the English Channel to Dover, and it is stated (*Zoologist*, iv., p. 1443) that such was the density and extent of the cloud formed by the living mass, that it completely obscured the sun from the people on board the continental steamers, and the decks were strewn in all directions with the insects. The flight reached England at noon, and dispersed itself inland and along the shore. During the sea-passage of the butterflies, the weather was calm and sunny with scarcely a puff of wind stirring, but in an hour or so after they reached *terra firma* it came on to blow great guns from the direction whence the insects came." Another account of the same flight adds that "every vessel that came into the harbour had the rigging and deck completely covered with them, and the pier was so thickly strewn with butterflies that you could not walk

without treading on them." Crompton records (*Ent. Mo. Mag.*, vii., p. 18) that at the end of August, 1849, he was crossing from Havre by steamboat, and that "about midday the vessel seemed to plunge into a swarm or snow-shower of common White butterflies, and so continued for nearly an hour. They literally covered us, circling round and playing up and down the vessel, and I was struck with the fact that they seemed to keep up with the vessel's speed—about eight knots an hour—as well as to flutter up and down. Either they flew at our pace easily, or were assisted by the air carried along with us in the calm. Gradually they thinned off, and a breeze arising, disappeared. At the same time an exhausted pigeon fell on board, and, a thunder-storm on the English coast coming in sight, our pleasant Sunday trip closed with a beauty of a different kind. I noticed in the papers a few days afterwards a paragraph about a large flight of white butterflies having crossed the Channel and landed on the Hampshire coast, and thought I had seen them on their passage." Another observer who was on an excursion in a fishing-boat in the North Sea, near the mouth of the Weser, in July, 1872, writes: "So long as the boat was in the river, or at its mouth, only an occasional Cabbage White was to be seen crossing the river, and soon disappearing, but, when once out at sea the boat was enveloped in a swarm of these butterflies, so thick as to resemble a snowstorm. The weather was hot, and the surface of the sea undisturbed by any wind. Many of the insects were to be seen poising themselves with erect wings on the surface, others were lying flat on it, as if dead, but flew away rapidly if disturbed. They were accompanied by dragonflies (*Æschna*) which evidently preyed upon them, and also by small flies and ichneumons."* It is further recorded by Dr. Schulte, that, in a dead calm off Nordeney, in the Baltic Sea, he steamed for three hours and for a distance of thirty miles, through a continuous flock of *Pieris rapae*; he was at the time some thirty miles from the mainland, and only five miles less than that from the nearest island. The shore was afterwards found to be strewn with their dead bodies. In July, 1864, on a still, hot day, with hardly a breath of air, Thorncroft records (*Entom.*, ii., pp. 289-290) a large immigration of *P. brassicae* and *P. rapae*, at Shoreham. He was "on the pier about 3 p.m., when the flood-tide set in with a gentle breeze, and then came a host of the above named butterflies, with a few of *P. napi*. There must have been hundreds arrive within a very short space of time." He expresses his surprise at "their alighting and settling on the sea, with expanded wings, and the ease with which they rose again, the same butterfly settling and rising as many as four or five times within a distance of a hundred yards, and with apparently as much ease as on land; they all came direct in from the sea from a south-westerly direction, and seemed to aim for the entrance of the harbour between the piers, though there were plenty of them came on shore on each side of the piers. The shore was covered with a coarse sort of Italian rye-grass, on which they were resting when we returned home, and, in walking through the tall grass, they rose in myriads." Robson gives (*Young Naturalist*, ii., p. 29) an interesting account of an immigration of *Pieris brassicae* that

* One wonders much what ichneumons were doing amongst a swarm of the imagines of the *Picris*.

he witnessed in June, 1867, at Hartlepool. He first observed an unusual number of white butterflies in the street, about 9 a.m., and their numbers steadily increased; by noon they were flying in hundreds, and at 2 p.m. there were thousands of them to be seen at once, all flying in one direction, *viz.*, from east to west. They continued to pass in undiminished numbers till towards 5 o'clock, when a sudden thunderstorm and very heavy rain came on. Such of the butterflies as did not obtain shelter were quickly driven to the ground where they were pelted to death by the rain, and floated in hundreds along the flooded channels. When the rain ceased the day was too far advanced for flight to be resumed, and next day, although there was a large number about the streets, they flew in a desultory manner and entirely without the steady purpose-like flight of the day before. Enquiry elicited that fishermen had seen the flight coming in from the open sea (where many had settled on the boats) which was perfectly smooth, and one or two had noticed that they rested on the water and rising again therefrom had pursued their flight. Robson calculated that the denser portion of the column was about 100 yards wide, although stragglers extended much further on either side. The length must have been very great, for the butterflies continued to advance from 9 a.m. until 5 p.m., and had not commenced to decrease in numbers when the storm dispersed them. Cordeaux reports (*Entom.*, vii., p. 161) that on the morning of June 4th, 1874, "very large numbers of *Pieris brassicae* and *P. rapae*, the latter, however, very greatly predominating, came into the North Lincolnshire marshes from the Yorkshire coast of the Humber (which, at this point, is from four and a half to five miles across). For an hour that I was near the sea embankment they were constantly passing inland, flying, too, against a rather stiff south-west breeze. Looking towards the centre of the river with a strong glass I could distinguish flights of them far away, flickering in the blaze of sunlight against the grey background of water, like falling snowflakes. I remember a very similar immigration of white butterflies in the dry summer of 1870." Our own observation (*suprà*) of the immigration of *P. brassicae* between Dover and Deal, took place in 1887, and the abundance of this species and *P. rapae* in the autumn of that year in Britain was extraordinary. Barrett records (*Ent. Mo. Mag.*, xxiv., p. 85) that towards the end of May, 1887, when walking along the top of the cliffs from Hunstanton to Old Hunstanton he came upon multitudes of *P. brassicae* (and to a less extent *P. rapae*) flying about the level ground on the top of the cliff, and settling in dozens on the flowers, without appearing to be in any such numbers inland. As there were no fields of cabbage, turnips, &c., in the neighbourhood, he suspected that he had come upon a flight of immigrants immediately after their arrival. Adkin gives (*Proc. Sth. Lond. Ent. Soc.*, 1899, p. 47) interesting details observed by himself and his daughter on July 27th, 1899, between Eastbourne and Beachy Head. On this morning, although white butterflies had not previously been very common, he noticed great numbers of *Pieris rapae*, large in size but poor in condition, fluttering over the furze on the upper part of the slopes, for the whole length of the down, the butterflies being left behind when the summit of the Head was reached. On returning to Eastbourne his daughter remarked that she had during the morning seen large numbers of white butterflies all flying in from the sea, and

he has little doubt that the great numbers of specimens he had himself observed on the cliffs belonged to the swarm that his daughter had seen arrive that morning.

The habit which butterflies have in calm weather of settling on the sea when migrating, has been observed by many entomologists. Pocklington records (*Entom.*, vi., p. 152) that in May, 1872, he watched several *Pieris brassicae* flying far from the shore in Boston Deeps (Wash), and observed one of them apparently fall in the sea, when, to his surprise, as the wave arose upon which it had alighted, the butterfly mounted with it and flew away uninjured and apparently refreshed by its resting there. The habit is important, as helping to explain the physical ability of certain species to travel what would otherwise appear to be almost impossible distances. A too frequent resting, however, would appear to be fatal, for it has been recorded more than once that, when thus resting, although they are able to rise a few times with ease, yet the scales soon get wet and then the insect has some difficulty in rising again, and when the power fails it necessarily perishes. We have already detailed (*suprà*) occurrences when large numbers of lepidoptera have come to grief on one of their voyages, but this must not be taken as in any way disproving the general fact of their ability to rest on the surface of the water. This failure has been noted in such strong-winged species as *Anosia archippus*, *Pyrameis cardui* and others, and it is probable that the attempt to rest once too often is sometimes the cause of the large number of dead lepidopterous insects which are occasionally observed floating on the surface of the water at various times and in different places. The ability, however, that butterflies have to rest in this manner has led to the suggestion that the butterflies, which periodically migrate between Ceylon and India, avail themselves of the habit whilst crossing.

The Giant Flea: Hystrichopsylla talpae (*with plate*).

By the Hon. N. C. ROTHSCHILD, B.A., F.L.S., F.E.S.

Entomologists, particularly coleopterists, from time to time come across the giant flea (*Hystrichopsylla talpae*). This insect would probably escape notice altogether were it not for its phenomenal size, it is in fact the largest species hitherto recorded, being no less than 5·5 mm. in length. During the last few years I have received several specimens of this insect from British entomologists, and as a slight recompense for their kindness I have endeavoured to give an accurate figure of one of the strangest British insects.

The Siphonaptera, though possibly the most succinct and highly specialised group of insects found in Great Britain, have hitherto received but little attention from English entomologists. The accompanying figure, drawn by my friend Dr. Jordan, will no doubt interest those entomologists who have captured specimens of *H. talpae*, and may possibly induce others to give attention to this very interesting family of parasitic insects. *Hystrichopsylla talpae* was originally described and figured by Curtis*, and has been figured again by

* *Brit. Ent.*, iii. (1826), no. 114, Fig.

Taschenberg†. Dr. Sharp also figures this flea in his recent work on insects‡.

The giant flea is parasitic on several insectivores and rodents, and occasionally on other mammals. Mr. J. J. Walker to whom I am indebted for some fine specimens, obtained it in the deserted nests of the field mouse. I have received specimens from *Talpa europaea, Sorex vulgaris, Crossopus fodiens-ciliatus, Mus sylraticus, Hyperdaeus glareolus, Mustela vulgaris, and Mustela erminea.*

EXPLANATION OF PLATE X.

A.	Hystrichopsylla talpae.	♀	
B.	do.	♂	End of abdomen.
C.	do.	♂	Ninth segment.
D.	do.	♂	Ninth tergite from the inside.
E.	do.	♂	Ninth sternite partly fused.
F.	do.	♂	Eighth sternite.

† *Die Flöhe*, Taf. iii., fig. 21 (1880).
‡ *Cambridge Nat. Hist., Insects*, ii., p. 523, fig. 250 (1889).

Lepidoptera in the Hautes-Alpes: Abries.

By J. H. and J. W. TUTT, F.E.S.

Melitaea phoebe was abundant, and its rapid mode of flight is more like that of *Argynnis lathonia* than any other species we know, whilst *M. parthenie*, few, but in good condition, occurred on the wastes near the river. We suspect the *M. varia* found on the upper heights of the Crête de Reychasse must be a form of this species. The blues also were very abundant. First and foremost *Polyommatus damon*, then *P. corydon, P. astrarche, P. hylas, P. escheri, P. eros* and *Plebeius argus*, all of which swarmed at the puddles and runnels of water and rose absolutely in "clouds" as we disturbed them. There must frequently have been three or four hundreds in a single little congeries, and with these, *Thymelicus lineola*, which abounds everywhere in these mountains, but was going over here, although quite fresh at Larche and even at Barcelonette, *Pamphila comma, Syrichthus alveus, and S. sao*, the last in very poor condition. On the slopes *Spilothyrus malvarum* and *S. althaeae* were captured, neither in the very best condition. Occasionally *Polyommatus icarus* was observed, perhaps half-a-dozen altogether. Among the Satyrids, *Satyrus cordula* was in abundance, and in very good condition, the males intensely satiny-black in colour, the females brown with large well-developed ocellated spots. One is puzzled, considering the apparent laziness of the females, to explain how it is they are frequently found, even in the earlier days of the appearance of the species, in such poor condition. The wings of both sexes are, however, of such a delicate texture that they split readily at the slightest provocation, and contact with the net is sufficient to ruin them. The insect occurred throughout the valley on every waste slope, and often up to a very considerable elevation. *Hipparchia semele* was abundant only by the side of the river, at Abriès, but on the roadsides towards Aiguilles becomes almost common; the males appear to be unusually dark, but the females much less distinctly of the *aristaeus* form than in many subalpine localities. *Epinephele lycaon* was exceedingly abundant, and *Coenonympha iphis* also, but the latter quite disappeared at this level during our stay, whilst *Pararge maera* was not uncommon by the road-

sides. *Erebia curyale*, of an unusually small form, was in great abundance, and exhibited some variation in the size of the ocellated spots, the general tendency being towards the suppression of the pupil and to a lessened size. *E. neoridas* was very common; previously we had looked upon this as a species belonging rather to low than to high altitudes, but here, although in swarms throughout the lower part of the valley, it went up to considerably more than 6,000 ft. elevation, as it also did at Larche. *E. tyndarus* was, as usual, everywhere, even in the village, whilst in one of the gullies, just above the hamlet, a single worn *E. stygne* showed that this insect also occurred here and was over, and we suspect that this was possibly the case with many other species. It was certainly so with *Chrysophanus hippothoe*, a few worn examples of which only were seen the first day or two of our stay, and but few *C. gordius* could be picked from the many worn ones that haunted the wild thyme as being fit for setting. On the other hand, *C. virgaureae* was in abundance and in the very finest condition, although some of the males were noticeably small; the females appear to be unusually bright and without the dull shading so noticeable in the specimens of some localities. As we have said, most of these species occurred in even greater abundance on the waste slopes get-at-able from the road than on the wastes at the level of the road itself, and on the slopes one noticed in addition *Cupido minima*, large and mostly worn, and *Nomiades semiargus*, some in the very finest condition. Worn specimens of what appear to be *Cupido sebrus* were also found, but their state precludes absolute certainty in naming them. The only Theclid seen was *Thecla spini*, which was not uncommon on the wild thyme with *C. gordius* and generally in good condition. Occasional examples of *Polyommatus orbitulus*, *P. donzelii*, and other visitors from the higher pasturages were now and then observed, usually in poor condition compared with those taken at higher elevations. The usual alpine moths were abundant about the town, and we were very pleased to take a few fine *Triphosa subaudiata* at light, an insect we had not seen since we captured it at Mendelpass in the Tyrol. *Thera simulata*, *Anticlea berberata*, *Gnophos obfuscata*, *G. furvata*, *G. glaucinaria*, *Hypsipetes sordidata*, beaten from the willows, *Acidalia mutata*, *A. flaveolaria*, with black margins to the wings, *Acidalia decorata*, very like *A. ornata*, *Cleogene lutearia*, *Sciaphila argentana*, *Eubolia mensuraria*, *Cidaria populata* and a species very near *E. bipunctata*, were usually more or less abundant, whilst *Ennychia punicealis*, *E. cingulalis*, and *E. cespitalis* flew about the flowers everywhere with the common alpine Pyrales. The beautiful *Pseeadia bipunctella* came to light, as also did a very ordinary looking *Bryophila perla*, whilst a species of *Eupithecia* was not uncommon on most evenings. In the early morning *Lithosia lutarella*, of almost English *pygmaeola* form, flew freely among the *Hippophaes* but *Setina aurita* was confined to higher altitudes on the mountains. The Anthroceras that occurred were interesting from the fact that practically typical *A. lonicerae* of very normal appearance were accompanied by large examples of the var. *major* which, however, rarely had a tendency to develop the peculiar characteristics of var. *medicaginis* like those of Pré St. Didier and elsewhere, but what interested one most was, that specimens with a small very faint sixth spot were occasionally taken *in copula* with typical five-spotted examples, and that

this occurred in both sexes, *i.e.*, five-spot males with six-spot females, and six-spot males with five-spot females. We certainly incline to look on these six-spotted examples as the result of a cross between *A. lonicerae* and *A. transalpina*, which was not uncommon on the same ground, although we have no proof of the supposition. *A. carniolica* was over, and *A. achilleae* but rarely seen. The absence of *A. exulans* on all the higher slopes that we explored was very unexpected.

But the high alps were much more to our taste, and so far as we explored them we had no cause to complain of a single day's sport. Everywhere there was an abundance of lepidoptera, and the only difficulty that occurred was in the rapid selection of what one wanted as one covered the ground, and one frequently felt that one was spending insufficient time in the most promising spots to find out what really was there. Two localities in particular we would suggest as being exceptionally good. One of these is the ascent to the Pointe de la Lauze, the other of the Crête de Reychasse. The Pointe de la Lauze is reached by means of a zig-zag course through a great larch forest. Directly opposite the Grand Hôtel a path leads to a little bridge crossing the Guil, and once over the bridge one finds oneself at once on the zig-zags that lead direct to the peaks above. The whole fauna of the forest gives one the impression at first blush of being purely subalpine—*Cleogene lutcaria*, *Acidalia flaveolaria*, *Larentia verberata*, *Sciaphila argentana*, and other characteristic common subalpine species fly out at every step, and every flower-head holds *Anthrocera lonicerae* var. *major*, *A. transalpina*, *Erebia euryale*, *Parnassius apollo*, *Gnophos obfuscata* and similar species, whilst *Argynnis niobe* and *A. aglaia* meet one everywhere. But when one reaches an opening—and the openings in a larch forest like this form a veritable paradise for the lepidopterist—one is less sure of the distinct alpine fauna, and is astonished at the mixture to be found. *Brenthis pales*, *Colias phicomone*, *C. palaeno*, *Erebia euryale*, *E. tyndarus*, *E. epiphron*, *Chrysophanus hippothoe* var. *eurybia*, *Plebeius argus*, *Polyommatus orbitulus*, *P. eros*, *P. eumedon*, *Melitaea parthenie*, *Coenonympha iphis*, *Argynnis niobe*, *A. aglaia*, &c., meet one at every turn, and *Papilio machaon*, as usual, seeks the high knolls, but mixed with these more or less subalpine species one sees a brilliant *Gonepteryx rhamni* flying across the clearing, or *Colias hyale* skimming along, together with an abundance of *Aporia crataegi*, *Pieris rapae*, *P. napi*, *Chrysophanus virgaureae*, *Polyommatus astrarche*, *P. corydon*, *P. hylas*, *P. damon*, *Nomiades semiargus*, *Cupido minima*, *Melitaea didyma*, *M. phoebe*, *Brenthis amathusia*, *Argynnis lathonia*, *Erebia neoridas*, *Satyrus actaea*, *Pararge maera*, *Epinephele lycaon*, *Syrichthus alveus*, *Thymelicus lineola*, *Pamphila comma*, and probably many other species unnoted. These species at least were in all the large clearings in the forest, and the myriads of *Larentia caesiata* and *Cidaria populata* disturbed as we walked along were more than bewildering, and quite prevented one picking out the apparently rarer *Cidaria immanata*, a few of which were obtained by promiscuous waving among a crowd of startled moths, *Hypsipetes sordidata* also being occasionally netted in this haphazard way. Something useful occurs at almost every step, and here and there the wealth of wild flowers is delightful, but presently one strikes the path that the cows take to the pastures every morning, the larches begin to thin out, the alpine rhododendron, with many bunches of its gay blossom

still in their first beauty, becomes frequent and here and there forms a dense scrub, and then one hears the stream that rushes away down to Ristolas. A big *Parnassius* flops near you—*P. delius*, by its denser and less transparent appearance—and soon the nets are busy for these are large and in fine condition, but one keeps climbing and then the *P. delius* are left behind. We hesitate as to whether we shall stick to the right, *i.e.*, follow the course we have pursued to the present or bear to the left, and, by following the cowpaths cross the stream. He who hesitates is lost! We have no doubt now that we should have followed our own path and come out on the slopes above the larches on the side of the stream by which we had ascended, but we took the cowpaths, and after following the course of the stream some time, crossed the latter, higher up than by the recognised paths. The marmot screamed its shrilly welcome from the rocky slopes leading up to the rugged peak above us, and the clouds began to gather on the mountains. Soon the sun went in and we had to wait for the gleams of sunshine to show us what insects were there. In these short periods we soon learned that on these steep short pastures, now well above the topmost larches, the highest alpine fauna had come. *Setina aurita* fluttered actively as soon as the sun showed itself, and the slight hollows were soon filled with *Psodos trepidaria*. The little grey Pyralid—*Hercyna alpestralis*—buzzed quickly, dropping like a stone as the clouds covered the sun again. The absence of the sun was soon felt; insensibly, we pulled our coats around us and trudged on. A moment's break, the sun peeped out on the steep and treacherous skrees, and *Erebia gorge* was fluttering everywhere; we step on the skrees, and away goes a large black butterfly, *Erebia glacialis*, and then another, and another. Evidently we had hit an excellent place for these species but the sun was covered by another bank of clouds, and the butterflies disappeared as if by magic. We climbed on and at last reached the first cairn. It was now 1.30 p.m., and we had been six and a half hours on our journey. Selecting a point of vantage, we swept the horizon. Far away to the east the snow-clad peaks of the Dauphiné Alps—Les Ecrins, La Meije, and other old friends. Directly south the huge Monte Viso and all its attendant peaks, to the north other old friends—the peaks round the Mont Genèvre pass and Briançon—and to the south-west the peaks of the Embrunnais, whilst almost at our feet, some 3,000 feet below lay the Guil, and the villages of the upper valley between Abriès and the Italian frontier. But the highest peaks are more or less buried in cloud, continuously changing, and opening up ever and anon vignettes of beauty in a new direction. A sharp ridge separates the basin of the stream that we have ascended from that that falls on the other side. We step over the ridge and immediately come upon an abundance of edelweiss that is growing everywhere. This limitation of its distribution struck us as being very peculiar, for not a plant was to be found anywhere on that side by which we had ascended, whilst on the opposite (southern) slope, within five yards of the crest, it was in profusion. We rested for a time, and then commenced the descent for it was clear that the sun would shine no more on these higher pastures until the late afternoon, although it was brilliant enough in the valley. We picked up several odd things on our way down, but we made no zig-zags and went straight down the slopes, walking, slipping and sliding in a most delightful manner. Soon we

left the frigid zone and entered the temperate, the temperate soon became subtropical, and by 3.30 p.m., when the hotel was won, and the sun poured its hot streams on the glaring road, we were glad to rest and lunch, and count up the treasures of a most enjoyable day.

(*To be concluded.*)

COLEOPTERA.

Coleoptera of the Rochester District.*

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

We have now in our hands Mr. Walker's complete list of the Coleoptera of the Rochester district, which has been published in Vol. ii. of *The Rochester Naturalist*. We do not hesitate to say that this list, which comprises the large number of 1615 species, is one of the best local lists of Coleoptera that has ever been published. Not only is the material it contains of a very satisfactory character, but the notes on the habits of species, dates, and methods of capture, are just what renders such a list of value, not only to the local collector, but to every coleopterist who takes an intelligent interest in the fauna of his country. It is also noteworthy that nearly the whole of the 1615 species have been captured by the energetic compiler, a fact, however, which is not surprising to those who have experienced the pleasure of collecting with Mr. Walker and know his untiring perseverance in the field. It is perhaps worth while to call attention to some of the 120 specially rare species which are marked with a double asterisk ** a number which only includes a small proportion of the rarities in the list :—*Drypta dentata*, Rossi.—"Four examples of this rare and beautiful insect were taken in moss at Chattenden in March and April, 1874." *Conosoma bipunctatum*, Grav.—"In very rotten damp beech-wood, Cobham Park, May, 1875." *Quedius longicornis*, Kraatz.—"One example of this exceedingly rare species was found by me at Cobham Park, under a small log almost buried in dead leaves, February 18th, 1899." *Emus hirtus*, Linn.—"A single example of this very rare and conspicuous beetle, the finest of our native *Staphylinidae*, was taken by Mr. W. Chaney, in 1869, running on the pathway at Darland Hill." *Philonthus fuscus*, Grav.—"I took a single example of this exceedingly rare species in Cobham Park, under a flake of hornbeam bark, August 18th, 1889." *Trichonyx sulcicollis*, Reich.—"One example of this fine and rare species was taken by me at Cobham Park, by sweeping, July 29th, 1889. *Pediacus dermestoides*, Fab.—"Under oak bark and in chinks in newly-cut oak wood, Cobham Park, rare." *Mycetophagus quadriguttatus*, Müll.—"In decayed ash tree near the Mausoleum, Cobham Park, rare, June, 1894; also in cut grass, June, 1898." *Heptaulacus villosus*, Gyll.—"This very rare insect was taken by Dr. D. Sharp, and myself, in the utmost profusion by sweeping in a very limited grassy spot on the south side of Cobham Park, on June 20th, 1889. It has since been found in the same place, in 1896 and 1897, but very sparingly." *Priomocyphon serricornis*, Müll.—"One specimen of this rare insect was taken by me on July 19th, 1897, at Cobham Park, in very rotten wood-mould in the stump of a large ash tree." *Grammoptera analis*,

* "The Coleoptera of the Rochester District." *Rochester Naturalist*, vol. 2. Published by the Rochester Naturalists' Club, Mathematical School, Rochester.

Panz.—"By beating elm at Chattenden; one example, May 28th, 1898." This longicorne is almost confined to the New Forest. *Bruchus canus*, Germ.—"On sainfoin (*Onobrychis sativa*), Halling Downs, scarce." *Cassida fastuosa*, Schall.—"A few specimens of this rare and beautiful insect have been taken in a very restricted space at Chattenden Roughs in moss, in early spring, 1874 and 1897; also one example by sweeping ragwort in the same spot, August, 1872." *Procus armillatus*, Fab.—"A single specimen of this fine and extremely rare weevil was taken by me in a dry tuft of grass on Darland Hill, March 11th, 1897." The few preceding extracts will serve to show what very fine species the list contains, as also the method employed in dealing with them. Every coleopterist who has not yet got this list should endeavour to do so as soon as possible.

Myrmedonia collaris, Payk., with Myrmica laevinodis at Wicken.—Whilst searching for beetles with Messrs. Bouskell and Chitty last month, under piled bundles of cut sedge in Wicken Fen, the latter found a single specimen of *Myrmedonia collaris*. As further search under those and other bundles near drew blank, I moved on to try and find a more suitable place and came across two small heaps of loose cut hay which I found to be full of *Myrmica laevinodis*. I concluded that here, if anywhere, we should be successful. In this I was right, as we were all three able to get a nice series of the beetle out of them. I would note that where the ants were most abundant I found the most *Myrmedonia*, and there also occurred in some numbers what I consider was without doubt the larva of the *Myrmedonia*. *Myrmedonia collaris* is generally considered not to be a true myrmecophilous beetle, Fowler says (*Col. Brit. Isles*, vol. ii., p. 56), "it does not, however, appear at all certain that this and the preceding are necessarily associated with ants," and Wasmann (*Myr. u. Ter. Art.*, 1894, p. 74), "It is not to be considered a regular myrmecophilous insect." I consider this record goes far to support its claim to be a true ant guest, especially on account of the presence of the larvæ. It is often recorded singly, or a few specimens at a time, in damp places, etc., (see Fowler *loc. cit.* and Bedwell, Morley's Suffolk List, p. 23) but I think that if search were made for the host near the spot as I did, that it is probable greater numbers would be taken, as in our case.—Horace Donisthorpe, F.Z.S., F.E.S., 58, Kensington Mansions, South Kensington, S.W.

Emus hirtus in Alderney.—Mr. E. D. Marquand captured a fine specimen of this rare beetle at the Blaye on July 9th, it looked like a wasp on the wing and was flying to a small heap of cow-dung. This is the first record of its capture in the Channel Islands.—W. A. Luff, Guernsey. *September 5th*, 1900.

PRACTICAL HINTS.

By J. W. TUTT, F.E.S.

Field Work for October.

1.—In October, the larvæ of *Coleophora salinella* should be collected from *Suaeda maritima* growing on the coast salterns.

2.—By collecting the seed-heads of wild marjoram in November, and keeping them exposed to the weather during the winter, I bred a fine series of *Gelechia subocellella* the following year (Elisha).

3.—A small trowel is, on the whole, the best implement to use for pupa-digging, a pupa-digger having the disadvantage of maiming most of the pupæ it happens to touch, though it is most useful in pulling away the grass round trees. A bark-ripper is objectionable, on the ground of the havoc it makes with trees, yet it can be used to advantage for picking off small pieces of bark (Hunter).

4.—The larva of *Uropteryx sambucata* hybernates well either in the open air or under cover, in a shed or outhouse; if in the open air a strong muslin bag tied to a branch of *Prunus spinosa*, in a sheltered position, forms a good winter cage, if under cover twigs should be placed in a bottle of water and the larvæ secured by a muslin bag tied round the neck of the bottle, the larvæ should be supplied with fresh food so long as a vestige of green leaves is obtainable (Grapes).

5.—The larvæ of *Plusia chrysitis* may be wintered on *Lamium album* planted in a large-size flower-pot secured by muslin tied round the rim and to a central support. On the approach of winter the larvæ cease to feed, secrete themselves in the folds of the fallen leaves where they remain throughout the winter; they recommence feeding very early in the spring (Grapes).

6.—The larvæ of *Aplecta nebulosa* should be hybernated on *Rumex* planted in a circular wooden vessel a foot or two in diameter, and covered with muslin tied tentwise to a central support (Grapes).

7.—The larvæ of *Cerigo matura* should be wintered on *Poa*, or coarse grasses, growing in a garden seed-pan filled with mould and protected by a muslin cover. It is advisable to examine the receptacle for predatory insects occasionally (Grapes).

8.—During the winter, larvæ of *Ephippiphora foeneana* and *Dichrorampha simpliciana* were obtained in the roots of *Artemisia vulgaris* and larvæ of *Coleophora murinipennella* on seeds of *Luzula pilosa* at West Heath, Hampstead (Elisha).

9.—During the autumn months the stems of *Impatiens noli-me-tangere* should be collected for the larvæ of *Penthina postremana* which emerge the following May (Hodgkinson).

By J. A. BUTTERFIELD, B.Sc.

10.—Collect diseased hips from wild rose. The larvæ of *Stigmonota roseticolana* emerge from them from the middle of September to the middle of October; place in the jar with the hips a few moderate-sized pieces of rotten wood, and cover well so as to prevent larvæ from escaping. When all have buried themselves in the rotten wood, place out-of-doors during the winter, bringing them in again in May. The imagines should be reared in plenty in June.

11.—In October dig up whole plants of ragwort where they are known to contain larvæ; plant in shallow boxes, a dozen or two in each box, and place in garden through the winter; if brought indoors in June *Ephippiphora trigeminana*, *Depressaria atricapitana*, &c., will be bred.

12.—Cut off shoots of mugwort six or eight inches from the ground and plant them in seedling boxes, two or three dozen in each; place in garden through the winter and bring indoors in June when *Ephippiphora foeneella*, *Dichrorampha simpliciana*, &c., will be bred in July.

13.—Roots of wild carrot, yarrow, thistles, &c., yield very good

results in the same way, and they are all plants that defy extermination.

14.—Collect fallen and diseased acorns; place in a shallow box containing leaf mould and dead leaves. Stand out of doors during the winter until June, *Carpocapsa splendana* will be bred in plenty.

15.—Beech mast collected and treated in the same way (as in 14) will yield *Carpocapsa grossana*.

16.—Collect heads of teazle in October (in the better cultivated parts of the country they are destroyed before spring); tie in bundles and suspend out-of-doors during the winter; put in a band-box in June, *Eupoecilia roseana* and *Penthina gentiana* will be bred.

17.—Collect upper two-thirds of stems of wild parsnip, and treat in same way (as in 16) for *Conchylis dilucidana*. Take care that the stems are placed out of the reach of earwigs.

18.—Collect flowering heads of yarrow, and keep in bags (made of the material in which Australian mutton is imported); they will produce *Conchylis smeathmanniana* (I have also bred in this way a species of *Eupoecilia* that I am not quite satisfied about).

19.—Golden-rod, aster, tripolium, *Anthemis*, &c., collected and tied up in similar bags, and treated similarly give good results.

N.B.—Some dozens of similar "Practical hints" will be found in the preceding volumes of this magazine.

CURRENT NOTES.

In the *Ent. Mo. Mag.* for September Mr. Champion records the capture in some numbers, under pine bark and fallen needles, near Woking, of *Anchomenus quadripunctatus*, De. G. This is practically an addition to our list, as it formerly rested on the authority of a single specimen, and has been left out of our latest catalogues.

Mr. Perkins records (*Ent. Mo. Mag.*, August) a series of *Odynerus tomentosus* as being in the Walcott collection of the University Museum at Cambridge, and as the collection is supposed to be entirely British, he adds the species to our list. The species is at once distinguished from any other of our known species by the ♂ having the antennæ formed as in the subgenus *Ancistrocerus*, but in neither sex is there a raised transverse line between the two faces of the basal abdominal segment; there are four abdominal bands in either sex, the basal one not dilated at the sides; immediately beneath the post-scutellum the propodeum has on either side a short tooth or projection.

After considerable hesitation, Mr. J. W. Tutt consented to edit the "Proceedings of the South-Eastern Union of Scientific Societies" for 1900, and the volume has just been issued under the title of *The South-Eastern Naturalist*.* It is a demy 8vo. volume of above 100 pages, and will have considerable interest to entomologists not only on account of the two valuable papers read by Mr. Merrifield, F.E.S. (one of the vice-presidents of the Union), at the Congress and herein published, but also on account of the full report of the discussion on these papers included. The whole of the papers are by first-class scientific men, and comprise: "The structure of the lower green-

* To be obtained of Dr. G. Abbott, 33, Upper Grosvenor Road, Tunbridge Wells, Kent. Price 2s.

sand in the neighbourhood of Folkestone," by H. C. Sorby, LL.D., F.R.S.; "On instincts which in some insects produce results corresponding with the moral sense in man," by F. Merrifield, F.E.S.; "The colour of pupæ in relation to their surroundings," by F. Merrifield, F.E.S.; "Dust: its living and dead constituents," by H. Gabbett, M.D.; "Science at the end of the eighteenth century," by A. W. Brackett; "The skin of liquids," by C. H. Draper, D.Sc., B.A.; "The Raised Beaches of Brighton and their microscopical contents," by F. Chapman, A.L.S., F.R.M.S.; "The protection of wild birds in the south-eastern counties," by J. H. Allchin. The important paper contained in the volume, however, is the Presidential Address by Professor G. B. Howes, LL.D., F.R.S., &c., the Secretary of the Linnean Society. Well thought-out papers on the general and broad principles underlying the study of natural history, of the weight, accuracy, and undoubted ability exhibited in this, are rarely met with in the lesser publications, and every entomologist who is a naturalist in the wider sense should certainly read it. We recommend this publication particularly to our wealthy provincial naturalists as being entirely worthy of their generous support.

Mr. King records (*Ent. Mo. Mag.*, August) the capture of *Somatochlora metallica* in some numbers at Loch-en-Ang and other lochs in Strathglass. It first appeared on June 16th (1899), but was much more abundant in July and August.

Lord Walsingham gives (*Ent. Mo. Mag.*, August) a review of the Tineid genus *Meessia*. He determines the Dorset species (that has been for some time standing in British collections) as not being identical with the *Meessia vinculella*, H.-Sch., of the continent, and names the British species *Meessia richardsoni*. At the same time, he asserts that the true *Meessia vinculella*, H.-Sch., does occur in Britain, there being a good specimen in the collection of Mr. Bankes, which was also taken in Dorsetshire.

Mr. Eaton adds (*Ent. Mo. Mag.*, August) the little black Trichopteron, *Beraea articularis*, Pict., to the British list, from specimens captured on Haven Cliff, near the mouth of the Axe, on a wet grass slope moistened by a dribbling spring. Wallengren placed the species in the genus *Ernodes* created for it, and McLachlan thinks that the genus should stand.

We are pleased to inform our readers that Lord Walsingham has acquired the Micro-Lepidoptera of the late Dr. O. Hofmann, so that the collections of Frey, Stainton, Zeller, Hofmann, &c., are all now available for scientific entomological students. As these will ultimately go to the national collection and become public property and so be available for future reference so long as the collections exist, entomologists generally owe Lord Walsingham a deep debt of gratitude for his action.

Mr. Saunders notes (*Ent. Mo. Mag.*) the capture by himself and Mr. Morice of *Nomada atrata* (*brevicornis*) on August 4th and 13th at West Clandon, and near Chobham, on *Scabiosa arvensis* and *S. succisa*. This species was erroneously sunk by F. Smith as a variety of *N. germanica* (=*ferruginata*), and so has to be reinstated in the British list. The same entomologist adds *Pompilus sanguinolentus* to the British list, a ♀ of this species having been taken by Dr. Sharp between Holiday Hill and Emery Down, in the New Forest, on July 18th last.

Mr. Marshall states (*Ent. Mo. Mag.*) that the damage recorded by Barrett as being done to fruit in Natal, and described *ante.*, p. 193, is not done by the moths at all, the offender being a Trypetid, the moths only being attracted by the exuding juice.

Lord Walsingham alters (*Ent. Mo. Mag.*) the specific name of *Phalonia erigerana* to *Phalonia sabulicola* owing to the similarity of *erigerana* to *erigeronana*, the latter a *Conchylis* named by Riley in 1887.

Mr. W. C. Boyd observes (*Ent. Mo. Mag.*) that a 4 per cent. solution of formalin is perfectly satisfactory in preserving female Psychids, the shape, size, and colour being exceedingly well retained.

Whilst we were at Chambèry we looked up the collections which the Société Histoire Naturelle de la Savoie keeps, and which the members kindly throw open to the public. The society, founded in 1844, is, we believe, largely aided by the local authorities, those of Chambèry, we were informed, granting 1,000 francs and those of Aix-les-Bains 200 francs annually. We had expected to find a collection of Lepidoptera of a very high order, as it is well-known that several eminent entomologists aided many years ago in its formation, but the careless exposure of the specimens in cases on walls in the full glare of the light has ruined what was evidently, a half century ago, a truly good representative collection of the lepidoptera of the district, and one finds now nothing but bleached specimens—*Pericallia syringaria*, *Ennomos autumnaria*, *Boarmia roboraria*, in fact, all the Geometrids, as well as Arctiids and Noctuids, are white as silver. The butterflies, too, are often wrongly named. *Erebia goante* is placed as *E. gorge*, a male *Satyrus cordula* pairs off with *S. dryas* under the name of *bryce*, and so on. One always wishes when one goes into a district for the first time that a good local collection may be available for reference. This rarely is so, but when there has been, and it has been allowed to go to ruin, one is more than disappointed.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Larva of Lithosia griseola ab. stramineola.—On October 2nd, 1898, I made the following note of some still-feeding larvæ of *L. griscola* ab. *stramineola*.—About 4''' long; head, black and shining; short dark-brown bristles on each segment; colour blackish with reddish markings between the segments and on either side of the black dorsal line, so that the body presents a sort of mottled black and red appearance; a distinct red blotch on pro- and mesothorax and another on the anal segment; the dorsum is almost without hairs, the latter appear to spring from the lateral tubercles; the lateral line blackish with very faint indications of paler markings; the ventral surface light brownish-black.—H. M. Edelsten, F.E.S., Forty Hill, Enfield.

Larva of Calligenia miniata.—On October 2nd, 1898, I made the following note of some hybernating larvæ of *Calligenia miniata*:—Length about 6·25mm. Head shining, yellow; body covered with long dark fawn-coloured hair tussocks, placed on each segment, hairs about 1·5mm. in length, the thorax covered with bristles; the body yellowish in colour, the ventral surface paler than the dorsum and lateral parts of body. The hybernating larva rests under pieces of bark, &c., lying on the surface of the sand, which leads one to suspect that it may be a ground-feeder in nature.—Ibid.

Egg-laying and food-plants of Macrothylacia rubi.—The eggs of *M. rubi* are, in this district, ordinarily laid in a more or less cylindrical group round a stout grass stem, generally a few inches from the base, and June rarely passes without my noticing a few such clusters. On these chalkhills the larva prefers the lesser burnet as a food-plant, refusing bramble for it, but locality appears largely to modify its habits, for in September, 1897, the larvæ were abundant at the tops of the tall Devonshire hedges near Dartmouth, where I repeatedly saw them select hazel as a food-plant. I also found them feeding at large near Wiesbaden on bramble and dwarf sallow.—R. M. Prideaux, 103, Reigate Hill, Reigate. *June 29th*, 1900.

Egg-laying of Macroglossa stellatarum.—From July 10th to July 20th, this species was abundant on the south Devon coast where I repeatedly had the opportunity of watching it egg-laying on *Galium mollugo* while hovering on the wing. The insect selects the top of a flowering spray as a rule, carefully examining it before depositing an egg. Rejected sprays, on being subsequently searched, were found to have been previously bespoken for the purpose. I have never found two eggs of this species laid on the same panicle of the plant, though ova of *Anticlea rubidata*, and probably those of the genus *Melanippe*, were commonly found near those of *M. stellatarum*. The green globular egg of the latter, though large, is not a very conspicuous object amongst the masses of round buds of the *Galium*, on which it is deposited usually; but I have occasionally found it laid on one of the upper whorls of leaves. The egg period lasted only seven days; the newly-hatched larva hangs by a thread when disturbed.—R. M. Prideaux, Reigate, Surrey. *July 24th*, 1900.

Food-plants and mode of feeding of larvæ of Callophrys rubi.—On June 11th, last year, when examining twigs of *Rhamnus catharticus*, a few Lycænid ova were detected, usually, but not invariably, deposited at the base of the calyx. These were hastily assumed to be those of *Cyaniris argiolus*, *Rhamnus* being a recorded food-plant of the latter species, and the initial mistake was well supported by the method of feeding of the young larvæ, which cleared out the contents of the immature berries of the buckthorn by means of holes drilled in the sides, precisely in the manner of *C. argiolus* when feeding on ivy. Subsequently the larvæ revealed themselves as being those of *Callophrys rubi*, taking as readily to the berries of *Cornus sanguinea*, when a change of locality rendered the buckthorn unprocurable. I have frequently reared this species on *Leguminosæ* such as clover and *Lotus*, under which conditions they fed from first to last entirely on the flowers. An examination of the same buckthorn bush, this year, has again revealed the presence of *C. rubi* ova, so it seems to be a food-plant regularly selected by the parent insect.—R. M. Prideaux, Reigate, Surrey. *August 14th*, 1900.

Mode of egg-laying of Cyaniris argiolus, with a note on the mode of feeding of the larva.—Ova and larvæ of this species were commonly found on immature ivy-umbels, during August of last year, the succeeding butterflies being unusually abundant this spring in the Reigate and Dorking district, the first recorded specimen being seen at the latter place on April 21st. Many of the eggs found last summer developed minute parasites, and two pupæ out of about two dozen, kept during the winter, produced the *Listrodromus* mentioned

by Mr. Morley (*Ent. Rec., ante.*, p. 186). Eggs of the species were found here, and in south Devon, laid upon holly twigs on which they are deposited far more indiscriminately than those of the second brood on the ivy-umbels, the base of the calyx being chosen, however, in most cases. The older larvæ, it was found, were just as well content to eat the young leaves at the top of the holly-spray, as to mine out the contents of the green berries, but, in my experience, the leaves of the ivy are never touched, either in captivity or at large, by the larvæ of *C. argiolus*. The butterflies of the second brood are again (Aug 14th) very common hereabouts.—Ibid.

NOTES ON COLLECTING, Etc.

Lepidoptera at Selby and Brighton.—Up to date (June 5th), everything has been very late and I have done little collecting. I have seldom seen Tæniocampids so scarce as they were this spring, and here I had but one night, not a favourable one, and only got two dark *Taeniocampa opima*. The nights have been so persistently cold that searching and sweeping for larvæ have been really disappointing work. *Agrotis agathina* are very backward, and I have had hard work to fulfil promises to some of my friends. On May 8th I went for ten days' holiday to Brighton, intending to work some of my old Sussex localities. However, the weather effectually stopped that, as it was bitterly cold with a fierce north-east wind and leaden sky the whole time, and beyond getting a few larvæ of *Sesia asiliformis* from oak stumps, I did literally nothing. Since my return I have been diligently searching for our dark form of *Cuspidia menyanthidis*, but at present have only taken three, and a few *Eupithecia indigata*. On Saturday I spent a long day at Bishop's Wood with Messrs. Porritt and Tunstall. Here again we found everything very backward—*Lomaspilis marginata* and *Acidalia remutata* were only just out, and neither *Cidaria silaceata* nor *Melanthia albicillata* were to be seen. Larvæ were scarce and small, and we failed to get either *Taeniocampa populeti* or *Tethea subtusa*, indeed, I never saw the wood so destitute of insect life at this time of the year. *Adela viridella* was the only species really abundant. Larvæ of *Cleoceris viminalis* were fairly plentiful in shoots of sallow, but many of these were still quite small. —(Rev.) C. D. Ash, B.A., Skipwith Vicarage, Selby. *June 5th*, 1900.

Lepidoptera at Market Drayton and in North Wales.—Following up my notes (*ante.*, p. 188) there appears at present to be every prospect of an abundant season, though insects are very late, some remarkably so, while a few only have been up-to-date. *Taeniocampa gothica* in a fresh state on May 23rd, *Anticlea badiata* on May 30th, and *Calocampa exoleta* on June 5th, are very unusual as far as my experience goes. *Nola cristulalis* (*confusalis*) was fairly numerous on oak-trees on May 23rd-24th, and five *Macaria notata* showed themselves. On June 1st I went into North Wales. A visit to the *Anthrocera minos* colony on the 2nd produced no result, and another visit on the 8th only produced two specimens, but a third visit on the 13th showed them in large numbers. The weather was very disappointing, cold on the whole and frequently very windy. *Sesia philanthiformis* (*muscaeformis*) was not flying during the first week, but I found a considerable number of pupæ by examining the

dead thrift plants. As far as I could see healthy living plants were quite untouched. The simplest way of amassing a quantity of pupæ is to pull up the dead thrift, and if traces are seen, *i.e.*, with a burrow in the stem, to put the whole piece into a bag without further examination. As the stuff is very light, a large bagful can be carried without difficulty. This insect likes bare rocks and not grassy slopes, and it prefers an almost perpendicular cliff. It only moves in bright sunshine, and it is of no use to try to take it, if there be any wind. On a still day it is very hard to see, and follow with the eye, as it flies very quickly and is in colour and size like a gnat. I saw either the insect itself, or traces of its presence wherever the thrift was growing on the rocks. Sugaring up to the 9th on the sandhills produced only two *Mamestra albicolon*, one or two *Heliothis marginatus* and *Leucania littoralis*, with plenty of *Hadena dentina*, and on June 5th a *Calocampa exoleta*, which, being supplied with cotton wool, laid during the night a large batch of ova and then died. The ova were white but in two days became brown, and the larvæ emerged on the 19th. Some of them are now feeding on groundsel and sow-thistle. During the next week *Agrotis ripae* came, but not in large numbers. The whole week only produced about twenty-five. Unlike its congeners—*Peridroma saucia*, *P. suffusa*, and others—it does not come freely to sugar in a wind, and when at all rough always comes to the sugar on the lee side of a post, and generally low down, but I found it came more freely to reed-heads sugared and stuck into the sand just above high water mark, below the line of vegetation, in the least windy spots. This species comes to sugar all through the night if not too windy, and on one occasion I took four and saw two others between 1.30 a.m. and 2.0 a.m. On other nights I obtained odd ones, several times, between midnight and 1 a.m. *Mamestra albicolon*, *Leucania littoralis* and *Heliothis marginatus* later appeared in larger numbers, especially the first. Two or three *Hecatera serena* appeared after the 16th. Red and white campion, and sea-campion flowers attracted *Choerocampa porcellus* in some numbers, and about thirty were bagged, *Dianthoecia conspersa* and *Plusia festucae* also came, but dusk work was on the whole disappointing. In one spot *Eupithecia venosata* of an unusually large size was common. On two or three evenings I visited the spot where I had taken *Dianthoecia* var. *barrettii*, but saw no sign of it, and altogether I took less than a dozen *D. conspersa*. The flowers seemed to be not nearly so attractive to Dianthœcias this year as last, and I think the want of heat prevented the flowers fully developing their scent. I have noticed in some very hot seasons the flowers of *Aira caespitosa* covered with insects, whilst in some other years not an insect seems to be attracted. One or perhaps two *D. conspersa*, and one *Choerocampa porcellus* per evening were not very encouraging after former experiences. This only refers to the sea-campion on the rocks. In the meadows the red campion seemed very attractive, but chiefly to *Choerocampa porcellus*, *Plusia festucae* and *Dianthoecia capsincola*. During the first week of my visit, as there were very few other insects, I caught and examined large numbers of *Polyommatus icarus* which were swarming on the sandhills. I found no noteworthy variation in any male specimen, but a few of the females were remarkable, especially one which had both primaries and secondaries entirely bright blue, excepting a slender black band on the hind margin of the

primaries and the row of spots on the secondaries. On the 13th I took a specimen of *Brenthis selene*, in which the black marks of the primaries were almost obliterated, making it conspicuous even on the wing.—F. C. Woodforde, Market Drayton. *June 23rd*, 1900.

Lepidoptera at Reading.—I was collecting beech leaves last week when I found a fertile ♀ *Stauropus fagi* that laid well, so I packed her off direct with the eggs to Mr. Bacot for description. It is a most unusual time to take wild females of this species in this neighbourhood. The time for the second brood is in October and November, and we never find any of the first brood after early June. This evening I have again arrived home with a full bag—*Dryas paphia, Argynnis adippe, A. aglaia, Limenitis sibylla*, &c., in large numbers and in first rate condition, but I only saw four examples of the second brood of *Leucophasia sinapis*, and I am afraid that this insect is being worked out. I captured the var. *valesina* among the *D. paphia*: it is rare in this district. I really started this morning for wild bees but the heat was so great in the sandpits that I could not continue working for them.—W. Barnes, 7, New Road, Reading. *July 24th*, 1900.

Lepidoptera in the Norfolk Broads.—A visit to the Broads in June after *Senta ulrae* was more or less a failure, only few specimens being taken by the three of us after a week's hard work; one of these was the ab. *bipunctata*. The weather was about as bad as it could be, and things would not come to light, though we had two big lamps and a moth trap, which was nearly burnt up owing to the oil in the lamps catching fire, so we hurled in all the wet stuff we could grab, and put it out at last. *Phibalapteryx lignata* was the most plentiful insect we saw; *Leucania flammea* was scarce and in bad condition, whilst amongst others caught at the light were *Spilosoma urticae*, *Arsilonche alborenosa* (including a ♀ which laid well), *Hydrelia unca*, *Xylophasia rurea*, *Noctua plecta*, *Apamea unanimis*, *Lobophora sexalata*, *Collix sparsata*, *Eupithecia valerianata*, *Acidalia immutata* and a good many micros, which I have not yet named. Larvæ of *Calamia phragmitidis* were swarming, and we collected some from which I have bred a long series, one or two quite pink. *Papilio machaon* was on the wing, and we found some ova and a few very young larvæ. A fine *Sesia formiciformis* and a pupa of *Plusia festucae* were also bagged, whilst larvæ of *Cosmotriche potatoria* were in swarms, and those of *Taeniocampa gracilis* abundant. A second visit in July was exactly the opposite as regards insects. They simply swarmed, and it was as much as three could do to box them off two lamps. *Leucania brevilinea* was in grand condition, also *Calamia phragmitidis*, and *Lithosia muscerda* was plentiful, but getting a bit worn. *L. griseola* and var. *straminola* were plentiful, *L. complanula* (a few), whilst *Cosmotriche potatoria* was in such abundance as to be a positive nuisance at the lamps. We also took *Notodonta ziczac*, *Noctua baia*, *Toxocampa pastinum*, *Leucania straminea* (worn), *L. impura*, *Coenobia rufa* (in great numbers), *Hydrelia unca* (very plentiful), *P. lignata* (second brood), *Geometra papilionaria*, *Epione apiciaria* (with one nice aberration), and *Acidalia emarginata*, whilst *Nudaria senex* was scarce, with *Strenia clathrata*, *Coremia unidentata*, *Acidalia immutata*, *A. bisetata*, *Chilo phragmitellus*, *C. gigantellus*, and many more. We got a nice lot of pupæ of *Nonagria cannae*, and larvæ of *Papilio machaon* were very common, and occurred everywhere, whilst those of *Arsilonche alborenosa* were also obtained, only a few larvæ of *Halias chlorana* were to be found

on the sallows, as also those of *Saturnia carpini* and *Notodonta ziczac*. Imagines of *Leioptilus microdactylus* and *Orthotelia sparganella* were captured. It was noticed that *Spilosoma menthastri* came regularly to light about 11.30 p.m., and once also a *S. urticae*. The pupa of *P. festucae*, obtained on our first visit, now produced an imago. Taken on the whole it was a very successful visit, and we returned well satisfied.—H. M. Edelsten, F.E.S., Forty Hill, Enfield, Middlesex. *August 28th*, 1900.

Lepidoptera in July and August.—During July larvæ were exceedingly abundant at Chingford and Tottenham, especially *Porthesia similis*, *Leucoma salicis* and *Malacosoma neustria*. A nice series of *Dicycla oo* was bred from larvæ beaten from an oak at Chingford, whilst *Zephyrus betulae* was very common in Epping Forest this season (one collector took over 80 larvæ by beating in three visits). From August 11th to August 27th I was at Folkestone. One of the most noteworthy insects that has appeared there this season is *Papilio machaon*, of which I saw two specimens, and Austin had caught one. My other captures among the Rhopalocera were—*Gonepteryx rhamni*, *Melanargia galathea*, *Pieris rapae*, *P. napi*, *P. brassicae*, *Colias edusa*, *C.* var. *helice*, *C. hyale*, *Argynnis aglaia* (worn), *Aglais urticae*, *Vanessa io* and *Pyrameis atalanta* were common, the larvæ of the latter almost everywhere; *P. cardui* also was abundant, it is some years since I saw it as abundant at Folkestone as it was this year. *Epinephele tithonus* (worn), *E. janira* (one with almost white hindwings), *Enodia hyperanthus* (worn), *Pararge megaera*, *Hipparchia semele*, *Thymelicus thaumas*, *Pamphila sylvanus*, *P. comma*, *Polyommatus icarus*, *C. minima* (second brood), *Cyaniris argiolus* (second brood), *Polyommatus bellargus* (second brood), *P. astrarche* (second brood), one an aberration with the underside white with suffused black dots, *Plebeius agon* (three worn, at Dover), *Polyommatus corydon*, several underside aberrations, one orange female aberration, one blue female, one female with spotless underside, and *Chrysophanus phlaeas*. Noctuids were plentiful at dusk, and the number of species too numerous to mention in detail. Larvæ of *Macroglossa stellatarum* were abundant on the yellow bedstraw, and the larvæ of *Choerocampa porcellus* were fairly common on the cliffs and readily found with a lantern at dusk as they crawled up the bedstraw to feed on the top shoots; of some three dozen larvæ captured, five only were of the green form. Larvæ of *Sphinx ligustri* have been rare this year; I took two larvæ of *Acherontia atropos* in a potato field facing the cliffs, but although I searched the whole field I obtained no more. On August 11th, 12th and 13th I observed that *Plusia gamma* was in countless numbers on every flower, a sight never to be forgotten. They swarmed at dusk round privet blossom, in the Marine gardens, where they fought furiously to get at the bloom. By the end of the week they had almost entirely disappeared and only a few stragglers were observed during the rest of my holiday.—C. P. Pickett, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *September 3rd*, 1900.

Partial double-broodedness of Angerona prunaria.—To-day, I found a female *A. prunaria* that had emerged in a breeding-cage. It was from a larva that had fed up rapidly during the summer, some 150 larvæ of the same brood being at the time of its emergence in the same cage, just preparing to hybernate.—Ibid.

Autumnal lepidoptera at Market Drayton.—Sugar has been

useless here since August 18th, but light was good from August 24th to September 1st, including *Luperina cespitis* (numerous), *Trichiura crataegi* (three), and *Epione apiciaria*—all of which are usually rarities with us. About a dozen *Colias edusa* have been taken or seen in the district, I took a perfect male to-day (September 12th), I have also had fourteen larvæ of *Acherontia atropos* brought to me, the first of which pupated on August 7th, the last on September 14th.—F. C. Woodforde, Market Drayton, Salop. *September 12th*, 1900.

Euvanessa antiopa at Chelmsford.—I have to record the capture of a nice ♀ specimen of *Euvanessa antiopa*, with a white border, by my father, on September 7th last. It was first noticed by an employé of my father's about a week before the date of capture. Nothing more was seen of it until September 7th, when my brother called my attention to it as it was alighting on a hedge, by the side of which were some ripe melons that had been cut and thrown there, and the strong scent from them most probably attracted the insect. While going for the net the butterfly rose, and flew off, but after some little chasing it was eventually captured from a pear tree by my father, about 1.20 p.m. Can your readers tell me whether *E. antiopa* has been recorded from here before?—Elizabeth Miller, The Croft, Rainsford Road, Chelmsford. *September 10th*, 1900. [Specimens are recorded (*Ent. Mo. Mag.*) as being captured this year on August 30th at Lowestoft (Smith), on August 19th at Huntingdon (Beauford), on August 25th at Newlands, Sussex (Brown); in *The Entom.*—two examples, in week preceding September 7th, at Lindfield (Houghton), August 18th at Herne (Single), September 5th at Yattendon, Berks. (Gull), August 30th at Streatley (Day), August 31st at Hornchurch (Thompson), September 12th in the New Forest (Smallpiece), September 11th at Bexley (Andrews).—Ed.]

Papilio machaon in Guernsey.—I have the pleasure to record the capture of a fine ♀ specimen of *Papilio machaon* for the first time, to my knowledge, in Guernsey. Dr. Bishop saw one on Delancey Hill on August 21st, he had no net with him, but fortunately was able to secure it under a straw hat. It was given to the Rev. F. E. Lowe, who very kindly presented it to me for my Guernsey collection. A specimen was seen by Rev. F. E. Lowe at Icart Point on August 13th, and Mr. R. V. Sherring, F.L.S., saw two specimens on August 17th. Other specimens have been reported as seen in various parts of the island.—W. A. Luff, Mount Pleasant, Burnt Lane, Guernsey. *September 5th*, 1900.

Lampides boetica in Guernsey.—On July 24th the Rev. F. E. Lowe saw a rather worn male of *L. boetica* on flowers of the blue lupin. No other specimens have been seen up to the present (September 2nd), but Mr. Baker has succeeded in finding several larvæ on their food-plant—*Colutea arborescens*. This plant is not a native of the island, but is to be found in several gardens and nurseries. From these larvæ several fine specimens have just been bred.—Ibid. [Later, on September 11th, Mr. Luff captured an example in his garden, and observed several others flying on this and the preceding days.—Ed.]

Rare Noctuæ in Guernsey.—*Leucania albipuncta*.—I have taken two fine specimens of this rare species at sugar during August, and the Rev. F. E. Lowe informs me that he has also taken several. *C. nupta* is rare with us, and I was pleased to see a specimen at sugar in company with a fine *Callimorpha hera*. On looking through a few

insects captured by Mr. Le Messurier, I was delighted to see two specimens of *Polysphaenis sericina*. This fine Noctuid is figured in *The Entomologist*, for April, 1876.—Ibid.

Deilephila livornica in Somerset.—On May 9th last I caught a specimen of *Deilephila livornica* in my surgery. Unfortunately it had flown into the gas and damaged the right upper wing badly.—Mark R. Taylor, The Cottage, South Petherton, Somerset. *August 23rd*, 1900. [Another is recorded as captured, June 22nd, 1900, at flowers of red valerian, near Croydon (Gower).—Ed.]

Cyaniris argiolus at Harrow Weald.—This butterfly has appeared in some profusion in our district, but although isolated specimens have occurred from time to time, I do not think until this year it has been generally abundant, and I never remember to have seen it in our garden before. The first example put in an appearance on May 19th, and there were several males a few days after flying about the ilex trees. Stragglers of the second brood also turned up in August, curiously enough all females, but both sexes were in profusion the first week in August, after five consecutive wet days, on the road between Harefield and Chalfont St. Giles (Bucks). *C. argiolus* is not common as a rule in this corner of Middlesex, but it has been observed in Cassiobury Park, near at hand, at Harrow Weald in the rectory gardens, and I have found it in Burnham Beeches.—H. Rowland Brown, M.A., F.E.S., Oxhey Grove, Harrow Weald. *September 7th*, 1900.

Autumnal emergence of Macroglossa stellatarum.—When at Folkestone, from August 15th-27th, I took many larvæ of *Macroglossa stellatarum*. I was much surprised to find two imagines had emerged in the breeding-cage on September 16th. The pupal period appears to have been very short, only a month from the the larval to the imaginal stage. I have since bred fourteen examples, and several more look as if about to emerge.—C. P. Pickett, 52, The Ravenscrofts, Columbia Road, Hackney Road, London, N.E. *September 24th*, 1900.

Lepidoptera at Tottenham.—I was collecting on September 13th in the neighbourhood of Tottenham, and took three *Catocala nupta* from the trunks of willows. *Pyrameis atalanta* was very common, both in the larval, pupal and imaginal stages; many of the larvæ were only about one-half grown.—Ibid.

Porthesia chrysorrhoea at Chichester.—After having entirely disappeared in this locality since 1877, when the larvæ were abundant on a whitethorn—*Crataegus oxyacantha*—hedge by the canal, a male *Porthesia chrysorrhoea* was taken on a lamp here on July 21st. This is the only specimen, however, of which I have heard.—Ibid.

Sphinx convolvuli at Chichester.—Hitherto I know of only one *Sphinx convolvuli* taken here this season. It was captured by a lady on her bed one day last week.—Ibid.

Papilio machaon larvæ in Kent.—On July 17th I found a beautiful larva in my garden on carrot, and shortly afterwards another not quite so large. Both were spotted and striped with green, black and white, the segments near the head being much thicker than the others. Two days later I found another larva dead, but although I examined the carrots growing in all the allotments around I had no further success. I put them down at once for *Papilio machaon*, although I was quite unacquainted with the larva, and saw no trace of the protective

osmateria mentioned as characteristic of it. The larvæ pupated on July 20th and 23rd respectively, one on the muslin and the other on the stem of a leaf. The imagines emerged from these pupæ in due course, the first on August 11th, the second on the 13th, both males. I also had a fine large ♀ brought me to set for Mr. Arthur Lubbock, which was caught in his stable only a couple of fields away.—H. Alderson, F.E.S., Farnborough, Kent. [Mr. Gervase F. Mathew stated in the *Daily Mail* of August 20th, that he turned out over fifty *Papilio machaon* in a marshy place where the food-plant grows, a few miles from Dovercourt in the summer of 1899, and surmises that a specimen captured at Ipswich might be one of the progeny. Single specimens are recorded in *The Entomologist*, from Kent, between Broadstairs and St. Peter's, on June 10th (Mann), on the outskirts of Blean Woods in the middle of May (Browne), a specimen bred from a larva taken in a kitchen garden at Lyndhurst, the larva pupating July 17th, the imago emerging August 1st, an imago at Ringwood, August 31st, 1900 (Fowler), from Hooe, August 18th, 1900 (Turner), near Hythe, August 15th, 1900 (Hutchinson).—Ed.]

Rearing Macroglossa stellatarum.—Whilst at Margate I took, on July 22nd, several full-fed larvæ of *M. stellatarum* feeding on *Galium verum* and *G. mollugo*. They pupated almost immediately, and imagines emerged from the pupæ on August 17th, 18th and 19th. I also took some small larvæ with a view of studying their habits whilst breeding them. For want of greater facilities I kept the larvæ in small well ventilated tobacco tins, the lids of which were kept closed. The result was not satisfactory, as the larvæ did not feed up well, and were inclined to pupate prematurely. As a result also, I presume, of the absence of light, the larvæ changed in colour to a deepish black.—A. Russell, F.E.S., Southend, near Catford, S.E. *August 28th*, 1900.

Acherontia atropos near Chelmsford.—Two pupæ of *Acherontia atropos* have been brought to me recently. They were dug up in a potato field near here.—Elizabeth Miller, Chelmsford. *September 10th*, 1900.

Acherontia atropos near Peterborough.—A few days since, I received a full-grown larva of *Acherontia atropos* taken near Peterborough. It has since changed to a pupa on the surface of the earth in the flower-pot on which I placed it.—T. M. Cottam, Threadneedle Street, E.C. *September 10th*, 1900.

Acherontia atropos in Kent.—*A. atropos* is evidently widely distributed in the Bexley district this year. I have seen over a dozen larvæ and heard of many more.—L. W. Newman, 4, Salisbury Road, Bexley, Kent. *September 2nd*, 1900.

Acherontia atropos in Kent.—I had a full-fed larva of *Acherontia atropos* brought to me on August 6th, and two more a few days later; several others have been taken in the district.—H. Alderson, F.E.S., Hilda Vale Road, Farnborough, Kent.

Acherontia atropos in Kent.—I took five nearly full-fed larvæ of *Acherontia atropos* from a potato patch adjacent to Margate on August 1st last. They were placed in a large biscuit tin, and after feeding sparingly two went to earth on the 5th, two on the 7th, and the remaining one on August 9th. Previous to doing so they wandered round and round the tin for two or three days, refusing food, and

shrinking somewhat in size. Four of the larvæ were of the normal green type, the fifth of a slightly different hue. They each measured nearly 5″ in length. I will report later as to the success I meet with in obtaining the perfect insect, but, having to return to town on August 11th, I am afraid the shaking up which the larvæ got during the railway journey home may not have conduced to their successful pupation. Whilst on the subject of *A. atropos* I may mention that I obtained a perfect insect on November 12th, 1899, from the pupa of the larva taken by me at Broadstairs on August 30th, 1899, and recorded in the *Ent. Record*, vol. xi., p. 307. I attribute my success in this to having followed the excellent advice given by Mr. Gervase F. Mathew in the *Entomologist*, vol. xxix., p. 328, as to the best means of successfully forcing the pupæ.—A. Russell, F.E.S., Catford.

Acherontia atropos in the northern counties of England and southern Scotland.—We are in receipt, from Mr. Mousley, of a number of cuttings from the *Yorkshire Post*, relative to the appearance of *Acherontia atropos* in the northern counties. The following are the localities noted: A larva in early August at Hovingham Hall (Worsley), a full-fed larva at Great Cotes, on August 16th (Quirk), a larva at Boston Spa, on August 19th (Prince), five larvæ, one measuring 7½ inches at Louth (Renton), two larvæ at Ripon (Smith), many larvæ (fifteen mentioned specifically) at Beverley, variable in colour and markings, those with dark brown stripes on *Lycium barbarum* (Boyes), an imago at Keighley, August 30th (Longton), an imago at Horsforth on August 30th (White), in Dumfriesshire (Service). The padding in which these facts are wrapped must be considered as belonging to the first class of newspaper entomology, *e.g.*, we learn from Mr. Paul that "the paradise of the insect in this country is in the fens of Norfolk and Cambridge, where the relative humidity of the air is always very high, and where solonaceous food is abundantly provided for them on the great breadths of potatoes raised there." Mr. Boyes denies that *A. atropos* visits bee-hives, states that Hüber was blind and obtained his information second hand, and suspects that all he wrote was the result of the fertile imagination of his servant François Beurnens. There are many other curious things.—J. W. Tutt. [Records from *The Naturalist:* August 26th, larvæ at Netherton (Fawcett), several in the Ulverston district (Petty), two near Ripon (Fawcett), an imago, June 23rd, at South Leverton, Notts., and a larva that pupated July 27th (Thornley).—Ed.]

Polygonia c-album in the London district.—On August 14th, while driving through a lane in Charlton, I noticed a newly emerged specimen of *Polygonia c-album*. It was quietly reposing on a nettle by the hedge side, so dismounting, I examined it for some time. Though Kent is of course a hop county, this is, I believe, the first recorded instance of its presence in this particular part of the county. I could easily have captured it, but, having no net, refrained.—Jos. F. Green, F.E.S., West Lodge, Blackheath.

Colias edusa and C. hyale in 1900.—I saw both *C. edusa* and *C. hyale* on the wing at Margate at the end of July, and took a few recently emerged imagines of each. Subsequently the weather became very dull and wet, and it was not possible to judge whether either of the species occurred in any quantity.—A. Russell, F.E.S., Catford.

When I saw *Colias edusa* flying in the garden on August 8th, and

my brother, *Colias hyale* in the Priory Park, close to this city, on August 14th, I was confident that both species of the genus *Colias* might be expected in some numbers. This has turned out to be the case. Having obtained the courteous permission of Edwin Habin, Esq., to hunt in his clover fields, through the indefatigable exertions of my brother, Mr. Frederick Anderson, I became possessed of 40 *Colias hyale*. Running in clover, and keeping an eye on the butterflies, which rarely settle, is by no means an easy task, as my friend, Mrs. Fogden, of Apuldram, discovered when she captured four *Colias hyale* on August 18th in her clover field, and kindly sent them to me. In this case certainly the ordinary attire of ladies does not tend to facilitate movement. In comparison, *Colias hyale* has this season been more abundant than the showier *Colias edusa*, for which reason, doubtless, only two of the variety *helice* have been noticed—one captured on August 17th, the other on August 31st. It is somewhat remarkable that up to the time of writing (September 4th, on which date he captured a ♀ *hyale*) my brother has this year taken 40 *Colias hyale*, whereas in the great *edusa* year of 1877 he caught 40 *C. heliee* var., and some in the garden. Except in the great distinction of sex, colour of sulphur in the male, and dingy white in the female, I have detected little or no variation in the specimens of *C. hyale*. I have in my cabinet, however, a male in which the two spots in the lower wings are large and very conspicuous, being of a brilliant orange; a truly splendid colour.—Joseph Anderson, Alre Villa, Chichester. *September 4th*, 1900.

On August 28th a young friend brought me a specimen of *Colias edusa* which he had taken (with his hat) at Beeston, Notts.—Douglas H. Pearson, Chilwell, Notts. *September 4th*, 1900.

Mr. Mousley sends us a number of cuttings from *The Yorkshire Post*, from which it would appear that *Colias edusa* was captured in early July at Stonefield, Dewsbury (Ridgway); *C. edusa* and *C. hyale* at Ely, on August 20th (Campion); several *C. edusa* at North Cave, East Yorkshire, during week ending August 22nd (Tomlinson); *C. edusa* in the Cleveland district of Yorkshire (Withington); *C. edusa*, between Fairhaven and St. Anne's, near Blackpool (Denison); several specimens of *C. edusa*, including one var. *helice*, on Yorkshire coast, during week ended August 25th (Stevens); *C. edusa* at Ripon (Watts). In *The Naturalist* are recorded: *C. hyale*, at Bridlington (Corbett); *C. hyale* and *C. edusa*, in the Ripon district (Fawcett); *C. hyale and C. edusa*, near Beverley (Lowther).—J. W. Tutt.

Since 1894-1895, *Colias edusa* has not been specially abundant in Belgium. One meets with it every year, principally in the upper part of the country, and particularly in the valley of the Meuse. In the two years mentioned above, they flew in millions in the lucerne fields, at Jambe, near Namur. This year it has been particularly rare in the neighbourhood, but I am imformed that it was very abundant in the Belgian Ardennes, especially at Libramont, from July 1st to 27th or thereabouts. *Colias hyale* is never rare in this country although never very abundant. This year on each of my outings in the valley of the Meuse and its tributaries, I was able to take a dozen. The imagines appear in Belgium towards the end of May, and continue to be seen up to September. *C. edusa* appears in June and continues on the wing until August. It is much easier to capture than *C. hyale*.—L. J.

Lambillion, Vice-president de la Soc. Ent. Namuroise, Namur. *September 4th*, 1900. [It would be most interesting if Mr. Lambillion could be induced to collect exact data as to the first appearances, last appearances, breaks in the continuity of appearance, and abundance (or the reverse) of these species, in many localities in different parts of Belgium, for a few years.—Ed.]

During August *Colias edusa* has been very abundant in Guernsey, Alderney and Sark, and several specimens of the var. *helice* have been captured. A few specimens of *C. hyale* have also been taken, but they have been far less common than *C. edusa*.—W. A. Luff, Mount Pleasant, Burnt Lane, Guernsey. *September 5th*, 1900.

It is certainly a *Colias* year locally, if not generally. My first sight of a specimen for eight years was at Deal, on August 3rd, when during the only gleam of sunshine I had on a three days' visit I netted two fine *C. hyale* on the Kingsdown cliffs. The following day I went to Littlehampton, but wet weather continuing until the 12th I did no day collecting. On that day, however, I set out on my bicycle for a *Colias* hunt, and came across them close to Poling Woods, in a stubble field, with a thick undergrowth. That morning I netted eleven *C. hyale* and six *C. edusa*, a proportion between the species which held good in this particular field during the next week. None were seen elsewhere on that day, but during the following week both species occurred sparingly throughout the neighbourhood, and in about equal quantities, but whilst in my original stubble field they daily increased in numbers, *C. hyale* continued to outnumber *C. edusa* by about two to one. Many male *C. edusa* were getting worn by the 20th, when I returned home, but nearly every *C. hyale* was equal to bred. The latter species was not nearly so strong on the wing as *C. edusa*, and, consequently, much easier to catch, and it also ceased flight for the day much earlier. I rarely saw it moving after 3.30 p.m. or 3.45 p.m., when it could be walked up in some numbers, but *C. edusa* flew freely for another hour, getting wilder in its flight as the day progressed. Only eleven female *C. edusa* occurred in all (including one var. *helice*), six of them on the last day, but *C. hyale* females were common, including a dozen or more fine, white specimens, and as many intermediate forms. A number of specimens found at rest in the late afternoon in the stubble field were invariably settled down on the stubble, and not on the clover, in which position they were almost perfectly concealed unless searched for very closely, the colour of the undersides exactly harmonising with the straw. On my journey up to town, although fine enough, I could not detect a single specimen on the London side of Arundel, and hearing from a friend this morning that he cannot find either species at Mundesley, on the Norfolk coast, I should judge that the distribution is not nearly so general as in 1892. I have seen no sign of a specimen yet near London.—Russell E. James, 18, Onslow Gardens, Highgate. *September 5th*, 1900.

A male *Colias hyale* was observed on Reigate Heath, August 8th, 1900, the only one seen, although I have not hunted for them. Two males of *C. edusa* were seen between Dorking and Guildford, August 11th, 1900, and a female on Mickleham Down, August 18th, 1900. This ♀ laid ova, larvæ from which are now feeding. On August 19th I found an egg at Reigate, then in the scarlet stage, which hatched August 23rd, 1900; two imagines, sex unknown, were seen on the

chalk hills near Reigate, September 4th, 1900.—R. M. Prideaux, Reigate Hill. *September 7th*, 1900.

I saw two male *Colias edusa* on September 6th, near Easingwold, about twelve miles north of York.—S. Walker, Eddercliffe, Queen Anne's Road, York. *September 9th*, 1900.

On August 19th, I went to Herne Bay with a friend, where we captured ten specimens of *Colias hyale* (both sexes), but only saw two *C. edusa*. On September 8th I went to Boxmoor, in Herts, with my uncle, Mr. A. Cottam, but the sun, although shining hotly before we got to the field, suddenly clouded over, and we only saw two *C. hyale*, both of which we took. I may add that when my uncle was at Bridgwater he captured several *C. edusa*, and in one clover field on one morning, he took thirty, including ten females, of which three were ab. *helice*.—T. M. Cottam, Threadneedle Street, E.C. *September 10th*, 1900.

Colias edusa has been moderately common in this neighbourhood during the autumn.—N. M. Richardson, Monte Video, near Weymouth. *September 11th*, 1900.

During August I have been travelling in the southern part of the dept. of Finisterre; the weather was rarely very fine, although in Cancale just previously it had been superb. I am particularly interested in *Colias edusa* and *C. hyale*. Both species are this year very rare in Brittany. In Finisterre I have seen very few *C. edusa* and no *C. hyale*. At Cancale I was out every day, and here, neither species was at all abundant, *C. hyale* even rarer than *C. edusa*. I saw perhaps, on an average, from six to eight *C. edusa* and two to four *C. hyale* each day. The former is extremely common some years, but this year, as I have said, *C. edusa* is rare. In my garden *Argynnis lathonia*, *Pyrameis cardui*, *P. atalanta*, *Polygonia c-album*, *Colias edusa*, *C. hyale*, *Lampides boetica*, *Polyommatus icarus*, *P. astrarche*, *Chrysophanus phlaeas*, *Gonepteryx rhamni*, *Pararge egeria*, *P. megaera*, *Coenonympha pamphilus*, *Hipparchia semele*, *Pieris rapae*, *P. napi*, and *Syrichthus malvae* have been flying. I do not remember having seen any other Diurni, between September 2nd and 14th. The best Noctuid that I have taken was *Heliophobus hispida*, and I have seen *Eubolia peribolata*.—C. Oberthür, F.E.S., Rennes. *September 15th*, 1900.

During a visit to Burgess Hill, in Sussex, extending from July 17th to September 10th, I saw a fair number of *Colias edusa* and *C. hyale*. The species were always seen together, either on clover in the weald or on the downs. The dates on which *C. hyale* were taken are as follows:—August 10th, two; August 11th, two; August 13th, one; August 14th, one; August 15th, two; August 16th, three; August 17th, three; August 18th, one; August 24th, one; August 25th, three; September 3rd, three (including one white specimen); September 4th, one; September 6th, one. *C. edusa* was seen in fairly large numbers on all these dates. On September 17th, two examples of *C. edusa* were seen in Belmont Road, Tottenham.—J. C. Dollman, Bedford Park, W. *September 17th*, 1900.

I observed *Colias edusa* and *C. hyale* first on Saturday, August 18th, when Mr. Mera came to see me, and captured fourteen *C. hyale* and two *C. edusa*. I had seen none earlier, and from the fine condition of the *C. hyale* I should suppose they had just appeared. I went out myself on August 21st, and took sixteen *C. hyale* with one *C. edusa*. On August 29th I took thirteen *C. hyale* and five *C. edusa*, on the

30th, fifteen *C. hyale* and three *C. edusa*, on the 31st, eleven *C. hyale* and five *C. edusa*, on September 5th, two *C. hyale*, and finally, on September 15th, three *C. hyale* all worn, and eight *C. edusa*, all ♂ s and perfectly fresh. In all, therefore, my lucerne field produced between August 18th-September 15th, seventy-four *C. hyale* and twenty-four *C. edusa*. The latter species has appeared here for the last three years in small numbers.—(Rev.) C. R. N. Burrows, Mucking. *September 18th*, 1900.

I have to record that at Ringwood during August *Colias edusa* and *C. hyale* were not uncommon. My captures were as follows:—*C. edusa*—August 14th, seven; August 15th, two; August 18th, thirteen; August 20th, sixteen, August 21st, four, August 22nd, four, August 25th, twenty; and in addition on August 18th and August 25th a specimen of *C.* var. *helice*. *C. hyale*—August 18th, two; August 20th, eight; August 25th, ten; whilst on August 17th, at Swanage, I took two *C. edusa* on the cliffs. The Ringwood specimens were taken almost entirely in clover fields, a few *C. edusa* being found in stubble fields, and one *C. hyale* by the roadside.—W. Bloomfield. *September 18th*, 1900.

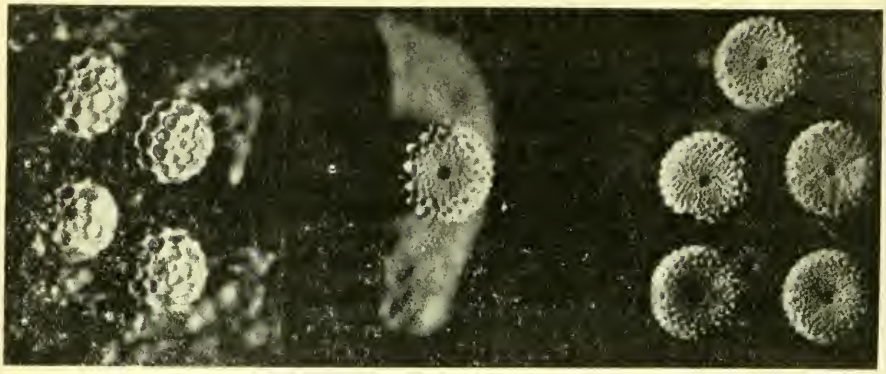
I have to record that *Colias edusa* was common at Lancing, in Sussex, from August 18th to September 1st, whilst on September 16th, at Mapledenham, I took one example of *C. edusa* and one *C. hyale*.—E. M. Dadd, 3, Colina Villas, Green Lanes, Wood Green, N. *September 18th*, 1900.

On September 13th, I knocked down a specimen of *Colias edusa* when out shooting near here.—H. Alderson, F.E.S., Hilda Vale, Farnborough, Kent. *September 18th*, 1900.

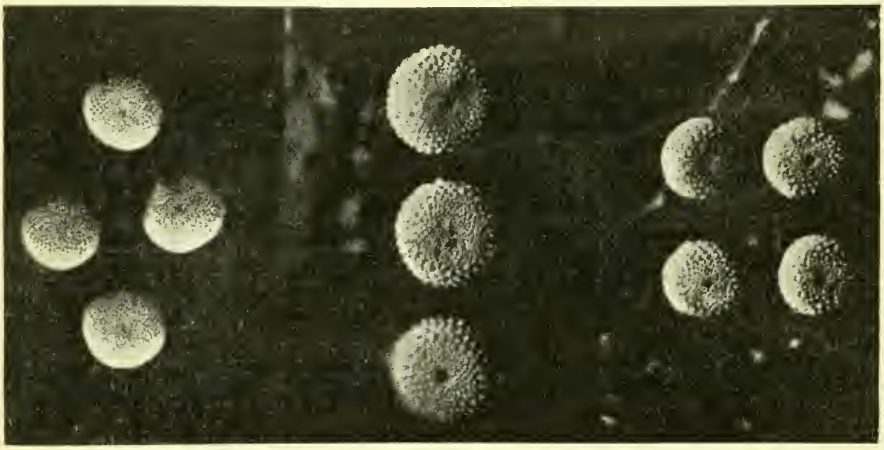
Colias hyale and *Acherontia atropos* have both been fairly abundant in this district this autumn.—L. W. Newman, 41, Salisbury Road, Bexley, Kent.

I saw specimens of *Colias hyale* and *C. edusa* in a field of lucerne on Beachy Head, in the second week in June. On July 30th I saw a freshly-emerged *C. hyale* at Worcester Park, Surrey. On August 29th I saw a number of *C. edusa* on railway banks at Whitstable; whilst the same day *C. hyale* was very common in a field of lucerne at Margate, more plentiful than the Pierids, and I took eight freshly emerged. I had to take my opportunity when getting these, as a hostile man was working in the field, and, of course, my quarry usually kept to the middle or the other side of it. There were no *C. edusa* observed in the field. On August 31st *C. hyale* and *C. edusa* were common at Folkestone, but were going over. On September 6th I saw *C. hyale* and *C. edusa* on railway banks at Sidcup, and the latter was also observed at Crayford on the same day, and at Eltham and New Eltham on July 7th.—C. W. Colthrup, 127, Barry Road, East Dulwich, S.E.

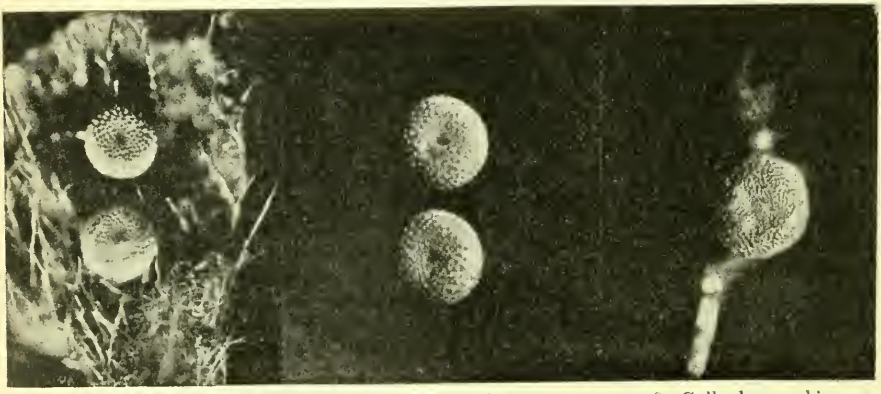
On August 13th, 1900, in a clover field at Upper Deal, two *Colias edusa* and five *C. hyale* were captured, and on the 14th, other examples of both species. On the 18th, at St. Margaret's-at-Cliffe, also in a clover field, *C. hyale* was taken, and at Kingsgate near Margate on the 24th, seven *C. hyale*, but many more specimens were seen than those captured, both at Deal and Kingsgate, *C. hyale*, however, always in much greater abundance than *C. edusa*.—H. A. Sauzé, 11 Venner Road, Sydenham, S.E. *September 19th*, 1900.



1. Chrysophanus phlæas. 2. Polyommatus corydon. 3. Polyommatus bellargus.



4. Polyommatus icarus. 5. Plebeius ægon. 6. Nomiades semiargus.



7. Cupido minima. 8. Cyaniris argiolus. 9. Callophrys rubi.

Eggs of Lepidoptera

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Photographing the eggs of Lepidoptera (*with plate*).

By F. NOAD CLARK.

The illustrations of lepidopterous ova exhibited in Plate XI have been reproduced from photographs made with the microscope from freshly-laid specimens, kindly supplied me by Messrs. Prideaux, Montgomery, Tutt, and Dr. Chapman, to whom I am much indebted. Those of the Lycænids lend themselves admirably to photography, in that they are of small size, and the surface markings are more or less in one plane of focus. The spherical surface of the larger ova renders photography more difficult, and in some cases, such as the Argynnids and larger moths, almost impossible.

Under casual observation, the several species of Lycænids appear to present but little difference from each other, but careful examination will show that really marked differences exist in most of the species. This is especially noticeable between those of *Polyommatus icarus* and *P. bellargus*, *Nomiades semiargus*, *Callophrys rubi*, &c.

The method of photographing these eggs is comparatively simple. The ultimate result is much enhanced if the ova are mounted in a suitable manner; for instance—a white egg should have a dark background, and *vice versâ*. Whenever possible, the egg should be photographed *in situ*, that is, as laid in the natural state, either on leaf, bud, or flower calyx, &c. In some of the examples illustrated they have been detached from their natural support, and, for the sake of contrast, placed on a spot of asphalt varnish. It is absolutely necessary that the eggs should be photographed in a plane exactly at right angles to the axis of the microscope, otherwise some of the eggs (if in a group) will certainly be out of focus, and consequently blurred in outline.

The objective I use is a 2-inch, and I make it an invariable rule to photograph all ova at precisely the same magnification, so that the results will give a correct idea of their relative size. Thus, the egg of *Cupido minima* is seen to be the smallest of the genus in actual size, as its name implies. Illumination is effected by means of an ordinary bull's-eye condenser, focussing obliquely the light from a good paraffin lamp. Exposure of the plate varies from one-half to two minutes.

Until a lens is invented which will give an image of a spherical object, representing more than one plane of focus, we shall have to be content with the present capabilities of micro-objectives. The obtaining of this, I fear, is far distant, but at any rate photo-micrography in its present state of perfection, gives us a correct and satisfactory means of

reproducing many beautiful objects in nature, and produces results unattainable by other means.

I much regret being unable to illustrate eggs of *Lycaena arion*, some continental specimens of this species, sent me by Dr. Chapman from Switzerland, having been injured during transit by post. At the time of writing I am photographing ova of *Zephyrus quercûs*, which are quite different in appearance from those of *Callophrys rubi*, and more nearly resemble those of *Polyommatus corydon*.

Explanation of Plate XI.

Fig. 1. Eggs of *Chrysophanus phlaeas*, July 8th, on *Rumex*, from Mr. Prideaux.
Fig. 2. Eggs of *Polyommatus corydon*, August 12th, on *Lotus?*, Abriès, from Mr. Tutt.
Fig. 3. Eggs of *Polyommatus bellargus*, June 11th, on *Hippocrepis*, from Mr. Prideaux.
Fig. 4. Eggs of *Polyommatus icarus*, June 13th, on *Ononis*, from Mr. Prideaux.
Fig. 5. Eggs of *Plebeius aegon*, July 17th, on *Erica cinerea*, from Mr. Prideaux.
Fig. 6. Eggs of *Nomiades semiargus*, July 31st, on red clover, Guarda, from Dr. Chapman.
Fig. 7. Eggs of *Cupido minima*, June 27th, on *Anthyllis vulneraria*, from Mr. Montgomery.
Fig. 8. Eggs of *Cyaniris argiolus*, May 29th, on holly, from Mr. Montgomery.
Fig. 9. Eggs of *Callophrys rubi*, June 11th, on *Rhamnus catharticus*, from Mr. Prideaux.

Four Weeks' Collecting in Scotland.

By LOUIS B. PROUT, F.E.S.

To the entomologist who has worked only within a comparatively restricted area, there is something particularly charming about a first visit to a really distant collecting ground, with a fauna which is quite new to his experience. The fact that I enjoyed this pleasure during my recent holiday, with the added charm of the genial companionship of my valued friends, Mr. J. A. Clark, Dr. Sequeira and Mr. J. P. Mutch, during the first fortnight, must be my plea for writing a short note which I am fain to confess contains nothing in the nature of discovery or original observation. The morning of Friday, July 27th, found us in Aberdeen, where we were hospitably welcomed by our kind friend Mr. Arthur Horne, and later on in the day we proceeded to our destination, the village of Stuartfield, which is reached by a pleasant drive of two or three miles from Mintlaw Railway Station on the Great North of Scotland Railway. At the "Commercial Hotel" at Stuartfield we were so fortunate as to find in the proprietor, Mr. James Mutch, not only an attentive and obliging host, but also a naturalist of considerable ability and exceptionally intimate knowledge of the country, to which we owe a great measure of the success of our holiday. On Colonel Ferguson's great estate of Pitfour, where we had obtained permission to collect, Mr. Mutch was particularly at home, and we had only to ask for bilberry, ragwort, heaths, sandhills, or what not, in order to be taken to an ideal spot for the object of our quest. With these advantages, it is not surprising that we made a good bag, notwithstanding adverse conditions of weather, which quite spoiled our sport on one or two occasions. A mere dry list of names of our captures would hardly prove very interesting, but I may mention that sugar in the woods proved very attractive, our patches being often literally smothered with moths, fighting for a drop of the coveted dainty. Of course the majority were such things as

Xylophasia monoglypha and *Triphaena pronuba*, but there was considerable variety of species, and we were pleased to take nice series of *Noctua sobrina*, fine varied forms of *Triphaena comes*, including the true var. *curtisii*, Newm., and also such deviations therefrom as *rufa* and *nigrescens*, Tutt, &c. (*Entom.*, xxii., pl. vi., figs. B—E), *Dyschorista suspecta* in every conceivable variety, and occasional specimens of several local species. Not infrequently among the crowds, specimens were observed *in copulâ*, and I noticed one abnormal pairing, *viz.*, between *Xylophasia monoglypha* and *Noctua baia*; of course, cases of this kind are of no scientific interest, but as curiosities they are worth putting on record. But the thing which impressed me most on the Pitfour estate was the marvellous attractiveness of the flowers of the common rush, particularly to Geometers. I am not exaggerating when I say that at dusk the air around the favoured plants appeared to be filled with a cloud of moths, mainly *Cidaria immanata*, *C. populata* and *Hypsipetes furcata* (*elutata*), and I shall never forget the sight that greeted the eye when our lanterns were turned on the bloom, after the visitors had had time to settle. I suppose the abundance of these species in this particular locality must be something exceptional, even for Scotland; for I understand that Mr. Horne, with his wide and varied experience of Scotch collecting, has not found it altogether equalled elsewhere. Of course selection of forms was impossible, as the Geometers named sit with the wings tightly closed over their backs, but, by boxing large numbers, we succeeded in securing magnificent varied series, particularly of *C. immanata*, which was just emerging. *Larentia didymata* was hardly less common, and a sprinkling of *L. oliverata*, *L. caesiata*, *Coremia munitata* and other species lent further variety to the sport. By day there was not very much to be done, chiefly on account of the unfavourable weather; the dearth of butterflies was very marked. We did best on the moors, where nice series of *L. caesiata*, &c., were obtained; also larvæ of *Saturnia pavonia*, but very few other larvæ, excepting those of the polyphagous *Notolophus antiqua* which were in countless thousands feeding on the ling.

On the return of my companions to London, on August 11th, I left Stuartfield for pastures new "in the famous neighbourhood of Forres." Having had full instructions from my kind friends, Messrs. J. P. Mutch and A. Horne, I had no trouble whatever in finding the collecting grounds, and was soon busy amongst *Erebia aethiops*, *Melanthia bicolorata* ab. *plumbata* and other interesting insects. I obtained eggs from several forms and grades of the "*plumbata*" type, and hope to get some interesting results next year; but unfortunately this species seems to lay very sparingly, and most of the batches of eggs are very small. By the way, what can have induced Guénée to make *bicolorata* a "*Melanthia*"? The comparatively unpolished egg with granulated surface and flattened end, the slender larva with double anal point, the mode of pupation and build of pupa, and even the superficial appearance of the imago, all point rather to an affinity with "*Cidaria*" (in Guénée's sense). Unfortunately I found that sugar was not working nearly so well at Forres as in Aberdeenshire, and the average number of visitors generally did not exceed one or at most two per tree. Under the circumstances, it is perhaps not surprising that I did not meet with some species which I was told

should be in swarms, such as *Noctua dahlii*, and, indeed, it is rather more surprising that amongst so few insects I was able to get fine series of *N. depuncta* and *Euperia palaeacea*, both of course new acquaintances to me. A very few *Aplecta occulta* turned up, but I failed to obtain ova. As for *Triphaena orbona* (*subsequa*), a species which is always associated with the name of Forres, I did not take one, and had it not been for a visit to the sandhills at Findhorn, where one was disturbed by day, I should have returned home without a single example of that species. This visit to Findhorn also added a few other new species to my Scotch list, namely, *Agrotis simulans* (which we had vainly sought in Aberdeenshire), *A. cursoria*, some nice forms, and *Dasydia obfuscata*, one female. The form of *Melanippe galiata* in this locality, with its ochreous-tinted ground colour, pleased me greatly, and I was careful to obtain a batch of eggs. I am inclined to think that this pretty moth is second only (among the Geometers) to a few of the Boarmiids (*e.g.*, *Gnophos obscurata* and perhaps *Boarmia repandata*, &c.), and to *Cidaria immanata*, in its tendency to geographical variation, and that most of our collections hitherto have done it less than justice.

My stay at Forres was limited to 13 days, and on Friday, August 24th, I was obliged to take my leave of Scotch collecting, but as I reckoned that I had made acquaintance with more than 20 species which I had never before seen in their natural habitat, besides many interesting local varieties and aberrations, I felt that I had good reason to be satisfied with my holiday, and I promised myself that it should not be many years ere I again selected "bonnie Scotland" for an entomological campaign.

The pupa of Libythea celtis.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

I have wished to obtain this pupa for a long time, but always without success. Why it should have been so difficult to obtain I do not know, as it is now supplied to me at a cost of 3d. each. The pupa is an interesting one as not being precisely similar to any other pupa I have seen. It is described as green, these I have are slaty-grey as a general effect, but variously coloured and marked. The effect is as of a pale dull flesh-colour with darker markings, the whole overlaid with a "bloom." This appears not, however, to be so, as the "bloom" does not rub off. Some figures show it as a long straight pupa, something like a green *Pieris napi* pupa, hung up by the tail.

The actual pupa is short and stumpy, reminding one of that of *Pararge egeria* as to proportions. Edwards' figure and description of the pupa of *Libythea bachmanni* would not be far out for that of *L. celtis*. The figure of that species given by Scudder brings out well the perhaps most characteristic point in the pupal structure, *viz.*, the projection of the 2nd abdominal segment dorsally with the ridges running from it. The pupa is clearly and simply a Nymphalid, with no Lycænid (or Erycinid) tendency whatever, and no more Pierid character than any other Nymphalid has.

In my paper on pupæ of butterflies, read at the City of London Entomological Society in 1894, and published in the *Ent. Record*, I was misled by published descriptions and figures into considering that *L. celtis* had certain Pierid characters, and especially that it had a single

nose-spine. The front of the pupa of *L. celtis* is very much of the type of those of *Pararge egeria* and *Argynnis aglaia*; a transverse, rather sharp ridge runs between the eyes, and just outside the glazed eye this ends in rather a sharp point, whilst there is a waved rise interior to this, with a depression in the middle line, so that there exists clearly the outer double spine that is so marked in the Vanessids, &c., whilst the inner pair are also indicated. At the angulated spine in front of the eye, the ridge of the nose-spine is continuous across the eyes and antenna with the wing ridge that continues to the spine on the 2nd abdominal dorsum. The whole line of this ridge, therefore, forms a complete circle round the pupa, in some it is a little waved, in others it is so straight that it all lies in one plane. This ridge is the most characteristic item in the pupal facies. Another marked peculiarity is the curving forwards of the abdominal segments, in some little degree by attitude, but chiefly by the narrowness of the fronts of abdominal segments 5, 6 and 7, so that, in some cases, possibly assisted by a little contraction by drying (though the pupæ are alive), the suspensory button on the anal segments almost touches the ends of the appendages on the 4th abdominal segment. The 8th and 9th segments are practically evanescent ventrally, but fairly well-developed dorsally. The total result is that the cremastral spine projects ventrally or even slightly forwards instead of posteriorly. The actual cremastral surface, with its armament of abundant minute reddish hooks, has the appearance of being on the back of the 10th segment instead of at its end, owing to the dorsal surface of that segment being extremely short, unlike its condition in *Vanessa*, *Pieris*, &c. This whole structure is very like that of *Argynnis aglaia*, where the ventral sides of the abdominal segments are shortened so as to bring the cremaster to the front of the pupa, and where the hooks are similarly apparently dorsal by the shortening of the dorsum of 10. The cremastral surface in *L. celtis* is more like that in the Vanessids than in any other related subfamily, being narrow and straight in an antero-posterior line. The similarly shaped surface in *Pontia* is transverse. The general surface of the pupa is free from any hairs and neither in this nor any other respect does it suggest any Lycænid character or affinity.

The pupa is 13mm. long, of which 3·4mm. only are occupied by the abdominal segments 5-10. Viewed laterally the smallness of these segments is seen to be quite as great as this measurement shows. The depth of the pupa (back to front) being 6mm. at the hump on 2nd thoracic, little over 3mm. at 5th abdominal. The dorsal spine on 2nd abdominal is nearly as high as that on 2nd thoracic, at least there is a difference of less than 1mm. in the thickness of the pupæ at these two points. The "waist" at 1st abdominal segment is made very marked by the following spine, the depth of the depression is quite 1mm. A ridge or keel runs dorsally the whole length of the pupa from the 1st thoracic to the last segment, and it is this that forms the spine of the 2nd thoracic; on the 3rd thoracic and the 1st abdominal it is a slight ridge on a flat surface, and is so also on the the 2nd abdominal to the spine, behind the spine it quickly subsides, and on the later segments is rather a white line than a ridge.

The spine of the 2nd abdominal is formed by the dorsal ridge, meeting the ridge, that is so far as I know peculiar to *Libytheinae*, which starts from the ridge of the nose-spine, appears on the eye outside the glazed

eye as a white mark, does not affect the antenna in crossing it, but appears on the mesothorax as a definite ridge, where it is probably identifiable with Scudder's "basal wing tubercles," runs down the inner margin of the wing behind Poulton's line, raises a sharp ridge across the hindwing at level of thoraci-abdominal incision, just raises corner of abdominal segment 1, and passes as a very marked ridge to the 2nd abdominal spine. The space on abdominal segment 2 in front of them is a sloping surface facing forwards, greenish in colour and with the dorsal ridge just indicated. The intersegmental subsegment is ill-marked, but quite distinct on abdominal segments 2 and 3. There is little movement of the abdominal segments, 5 and 6 being free, the checking of antero-posterior movement is decided but not absolute if the pupa be moved artificially. Actually the pupa itself only uses lateral movement, which it does extremely actively. Apart from the dark line of the dorsal ridge in front of the abdominal spine and the white line it forms behind it and the white line of the Libytheine ridge, there are many dark marks and shadings which vary a good deal in different pupæ. The 3rd and following abdominal segments have on either side two black spots near the middle line, almost like trapezoidals; between these and the spiracle is a little group of three spots.

The dark wing-shadings are especially marked along the costa, basally along the anal margin, and interruptedly along the middle of the wing and at the apex; some specimens suggest that these marks may invade nearly the whole wing. The wing-surface is rough, with a broad steep slope outside Poulton's line at the hind margin, vein 1*c* (1st anal) is very prominent and often marked by a white line whilst 1*a* and 1*b* may be made out. Perchance what I have called 1*c* (1st anal) may be 1*b* (2nd anal), as it is very unusual for 1*c* to be visible at all on a butterfly pupa. The wing apices are separated by the tips of the antenna and of the maxillæ. The 2nd leg reaches down three-quarters of the distance to this point, and the first fully half, both reach up to the eyes, so that the first is separated from the antennæ. Above the broad bases of the maxillæ the cheeks nearly meet in the middle line by a triangular process of which the apex is not marked off as mandibles, some small tubercles between these are probably labrum.

The figures of this pupa in the works of European authors are very defective. That of Esper is very poor but correct so far as it goes. Hübner gives it a definite single nose-spine, and omits the girdling ridge. Boisduval's figure is good, except that he gives a very definite nose-spine. Ochsenheimer does not figure it but says it has no nose-spine. Praem's figure is poor. Hofmann's resembles it in no respect, being a straight *Pieris* pupa with long nose-spine. Many authorities agree in making it green, whilst mine are distinctly grey. The probability seems strongly to be that it is a dimorphic pupa of the type so well investigated by Mr. Merrifield.—*June*, 1900.

British Lepidoptera—Mr. Bateson's review.

By W. J. KAYE, F.E.S.

Mr. Bateson in the September number of the *Entomologist's Record*, has reviewed Mr. Tutt's second volume of *British Lepidoptera*. In so

far as the review is favourable probably the vast majority of the subscribers will be with him. In the last two paragraphs, however, opinion is likely to be greatly divided, and it would be well to know the views of others. Mr. Bateson here opens up the question as to whether certain general biological questions included in the systematic part of the work, should not have been "fully digested and arranged," and then dealt with in separate chapters. I suspect that Mr. Bateson here refers more particularly to the details relating to gynandromorphism, hybridity, and such-like questions. Considerable material relating to the former is dealt with in the chapter on the Anthrocerides in vol. i, and, again, in vol. ii, much detail is gone into relating to the Lachneides. The reviewer would have, I take it, these details collected together in a general chapter on gynandromorphism. Now, however desirable this may be, it is necessary to ask: (1) Whether such special matter relating to a special group can consistently and with satisfaction be divorced from that group? (2) Whether the material is yet available on which to found a general chapter on this subject of sufficient importance to class with the other general chapters in this work? Would it not be better done when the detailed material of a number of other superfamilies (including the butterflies) has been worked through? The amassed material must of necessity be so much greater and the generalisations obtained be more valuable and far-reaching. Mr. Bateson goes on to say that "it is no doubt impossible for a very busy man to carry out such a task" (the task of digesting and arranging in a special chapter). One suspects that if it were the general wish of his subscribers, Mr. Tutt would not find it impossible, and, indeed, would overcome the difficulty. The question uppermost in the author's mind was doubtless whether the one or the other course was the more valuable, and, as one of the subscribers, I am certainly inclined to uphold the course the author has chosen. We shall all no doubt be greatly interested in such a general chapter, with all the scientific results obtained, if one be published in a future volume, but there can be no harm in knowing beforehand the units that are to build up the whole.

Another general biological problem possibly included by Mr. Bateson in his criticism would be that of hybridism. There is much material relating thereto already in the chapters on the Anthrocerides and Lachneides. Here again the same general remark holds good. The amount of material that is sure to be forthcoming when such groups as the Sphingids, Saturniids, and Notodonts are worked through, is certain to be very great, and we can confidently expect that very much will then appear that has never yet been seen in print. One enquires also, whether the author should exclude the considerations of the material at hand when he was studying those superfamilies just named, and reserve it till he feels safe in dealing with it in connection with similar material that he may in future collect in his study of other superfamilies? Should we not rather be thankful that such general matter as has already been worked out, is where it can readily be found, than stored away awaiting development, and so, in no small measure, risk the possibility of never being published at all? Would it not have been better to have asked that when a convenient time had arrived such subjects as "gynandromorphism" and "hybridism," and other general biological problems, should have

a separate chapter in addition to the details being included in their proper systematic position? In the general chapter on the Psychides it would surely have been strange if no mention or reference had been made to parthenogenetic reproduction, yet, in vol. i, there is a general chapter on "parthenogenesis," and it would surely be unwise not to mention the phenomenon in the different superfamilies as they are in turn treated. One surmises that Mr. Tutt chose to write a general chapter on "parthenogenesis" before he said anything about it in the systematic portion of the book, because he felt in a better position to tackle this biological question, but we should not be impatient because similar chapters on hybridism, gynandromorphism, &c., are not to be found in vol. ii.

There is another point raised by Mr. Bateson, *viz.*, whether a certain section of the book could not be increased at the expense of another. Reference to the preface to vol. ii shows that the author was fully aware that this criticism would be forthcoming. Mr. Bateson would surely not, considering our scanty knowledge of the details of the distribution and localities of our species, really seriously suggest, especially after reading what the author says about the distribution of *Malacosoma neustria*, that the full local lists should be cut down to increase the space for references! The author very tritely explains in the Preface, that his answer to any criticism involving an increase in the size of the book, would be that he "cannot get a quart into a pint pot." We take it that Mr. Tutt by this wishes to convey to us that his printer will not print any more pages for the same money. The volumes are, without any increase, quite stout enough, and none of us can grumble that there is not enough printed matter for the price. In any consideration as to whether the local lists could be cut down, it must surely be admitted that the author is likely to be the best judge of the wishes of a large majority of the subscribers. Speaking as one of them, I would suggest that the consensus of opinion would be almost entirely against such an idea. To the active working entomologist they are invaluable, and as the author has enlisted the subscriptions of a large number of such entomologists one can easily surmise what their verdict would be. If the author does not object to criticism, it would be interesting to know from the subscribers what their opinion is. Apart from the difficulty of knowing what to discard and what to retain, from the scientific point of view, my own strong personal conviction is that the full lists should be retained for the benefit of collectors, for whom the book is intended, as well as for students, as the title-page tells us. The sympathetic remarks of Mr. Merrifield in the *Entomologist*, and those of Mr. Bateson on the general contents of the book must be most gratifying to the author and some compensation for the close time spent in its production.

COLEOPTERA.

Coleoptera at Rannoch in June.

By T. HUDSON BEARE, B.Sc., F.R.S.E., F.E.S.

Mr. Donisthorpe and I left for the North by the 8.30 p.m. express from Euston on Friday, June 22nd, and arrived at Struan station about 8 a.m. on Saturday morning. Our luggage was to go by the mail cart to Kinloch Rannoch, and we were to cycle over, but an unfortunate

mishap to his cycle made it necessary for Mr. Donisthorpe to take a seat in the mail cart also. Crossing the lonely moor which lies between Struan and Rannoch, and where the steepness of the road compelled a general dismount, we turned over stones by the wayside, but nothing beyond *Harpalus latus*, L., and a few other common things rewarded our efforts. After breakfast, at the Bunrannoch hotel (which was our headquarters during our visit), much relished after the two hours' ride across those fresh and breezy moors, we started out and devoted the rest of the day to the mountains south of the village. The lower slopes yielded nothing, but on the higher levels under stones we obtained the following—*Nebria gyllenhalii*, Sch., *Calathus melanocephalus* var. *nubigena*, Hal., *Pterostichus citreus*, Dej., with quite black aberrations, *Patrobus assimilis*, Chaud., *Tachinus elongatus*, Gyll., *Bradycellus placidus*, Gyll., *B. collaris*, Payk., *B. cognatus*, Gyll., *Patrobus septentrionalis*, Dej., this last insect was very difficult to secure; in fact, collecting these hill-frequenting Carabs is very hard work and requires an unlimited stock of patience. One scrambles painfully up through the heather, breaks one's back and tears one's fingers turning over stones, often deeply imbedded, and in nine cases out of ten without finding a single insect to reward one for the labour of lifting them. Coming down from the higher levels we found our way back through a lovely glen, with very steep birch clad sides, here we beat off the birches *Elater nigrinus*, Hbst. (taken again later on close to the lake side), *Deporaus megacephalus*, Germ., *Anthophagus testaceus*, Gr., and other commoner things. The 24th opened very inauspiciously, pouring wet and very cold, but as time was limited we determined to venture out and to make our way to the famous Black Wood. We of course cycled there, and, on the way, just past Carie glen, noticed a new pine post wire fence on the lake side of the road. On this fence the keen eyes of Mr. Donisthorpe spotted an *Astynomus aedilis*, L., as we rode by, so we at once stopped and carefully searched the fence from end to end, it proved very productive, not only on this occasion, but during the rest of our stay, for we never failed to pay one or more visits every day, in fact, but for this fence, we should have come away without several of the Rannoch specialities we were most anxious to secure. On it, besides *Astynomus*, a fair number (though the local people told us the insect was over and that we should get none), we got *Asemum striatum*, L., *Rhagium indagator*, L., in great numbers, *Pissodes pini*, L., *Clerus formicarius*, L., *Corymbites cupreus*, var. *aeruginosus*, Germ., *C. impressus*, F., and others. In the wood we got very little, as everything was soaking with wet, but managed to find under lichen, on a fallen tree, *Pytho depressus*, L., and in a rotten log under the bark, *Rhyncotus ater*, L., in plenty, with the dark var. of *Quedius cruentus*, Ol., and *Liodes glabra*, Kug., with plenty of *Quedionuchus laevigatus*, Gyll., under bark of all the fallen logs. The 25th, Monday, was another dull day with showers, we tried first some felled pine trees in a field close to the village, here under the bark we got *Ips quadripustulatus*, F., *Rhizophagus nitidulus*, F., *R. dispar*, Pk., *Nudobius lentus*, Er., *Tomicus acuminatus*, Gyll., *Homalium pineti*, Th., and *Trypodendron lineatum*, Er., in profusion. This latter insect required no digging out of the hard wood, as is supposed; it occurred in plenty in its burrows in the bark itself, and was therefore easily obtained by breaking the latter up. In addition, *Epurea aestiva*, L., and *E. angustula*, Er., and other things turned up

under this bark. Beating tops of pines, which had been cut off and were lying in the grass, produced *Rhinomacer attelaboides*, F., *Ernobius nigrinus*, Sturm, *Magdalis phlegmatica*, Herbst, &c. The afternoon was spent in the Carie glen, sweeping, beating, and working the numerous nests of *F. rufa*, but the whole work was very unproductive. We were evidently too late for the ants' nests, and, though we found numbers of empty *Clythra* cases and a few of those of *Cetonia aenea* also empty, and the larvæ of the latter insect, we got nothing else coleopterous. The small moth *Myrmecocela ochraceella*, Tgstr., was found in the ant hillocks. The only things worth mentioning from sweeping, which was singularly unproductive all through our stay, probably from absence of sunshine, were *Halyzia* 16-*guttata*, L., and *Rhagonycha elongata*, Fall. Tuesday, the 26th, was given up to another day on the hills, this time on the north side of the Loch, here we found most of those which had turned up on the first day, and, in addition, we got under small shingle by the side of a mountain torrent *Cryptohypnus dermestoides*, Hbst., and its variety (?) 4-*guttatus*, Lap., in plenty, and one specimen of *Oxypoda rupicola*, Rye, with *Byrrhus fasciatus*, F. In deer dung on these hill slopes we obtained *Aphodius lapponum*, Gyll., *A. putridus*, Cr., and *A. depressus*, Kug. On the moors here we tried our only water-beetle work, on the whole with poor success, though we secured a few of the northern forms, *viz.*, *Agabus congener*, Thunb., *A. bipustulatus* var. *solieri*, Aub, *Hydroporus morio*, Dj., and *H. marginatus*, Duft., *Agabus guttatus*, Pk., was common, and a specimen of *Rhantus bistriatus*, Berg, turned up. On Wednesday, 27th, largely acting on local advice, we cycled to the west end of the Loch and tried the saw-pit there, but got practically nothing. On our way back, sweeping flowers produced *Dascillus cervinus*, L., *Telephorus obscurus*, L., and *Tropiphorus mercurialis*, F., &c.; we then paid another visit to the Dall saw-pit, where Mr. Donisthorpe was lucky enough, knocking down a flying insect, to secure *Saperda scalaris*, L., a beautiful insect when thus freshly emerged; under chips at the pit I got *Trechus rubens*, F., and *Ips* 4-*pustulatus*, F. While resting and eating our lunch at the edge of the Dall saw-mill stream, we saw and took *Hydrocyphon deflexicollis*, Müll., in plenty, it was flying in the sunshine and settling on the dry tops of the stones lying in the stream. Thursday, the 26th, our last complete day, was devoted to a search for *Trichius*, but though we were on the spot where it annually occurs in fair numbers we were evidently too early for it, we found, however, in rotten birch stumps, what were evidently its larvæ in fair numbers; another visit to Dall saw-mill produced *Eros aurora*, F., fairly common under chips, and I took a specimen of *Sphaerites glabratus*, F., several specimens of *Hallomenus humeralis*, Pz., turned up under bark, and a few common things. General collecting during our visit under stones near the Loch side produced *Otiorhynchus blandus*, Gyll., *O. maurus*, Gyll., *O. muscorum*, Bris., and *Carabus arrensis*, Hbst.; sweeping and beating at various spots on the lower levels secured *Helodes marginata*, F., *Campylus linearis*, L., a blue var., *Corymbites quercus*, Gyll., with the var. *ochropterus*, Steph., *Sericosomus brunneus*, L., ♀, *Telephorus figuratus*, Man., and ab. *scoticus*, Shp., *Rhagium inquisitor*, F., *R. bifasciatum*, F., *Elater balteatus*, L., &c., while sluicing at a sandy spot in a small bay on the Loch produced *Bledius subterraneus*, Er. *Cetonia aenea* we did not meet with, we tried to find a *Cossus*-infected tree in the Black Wood where we

had great hopes of coming across it, but somehow managed to get astray and did not hit the tree, so we had to come away without this insect and *Trichius*, although almost all the other specialities were found in our six days' work. On Friday morning after I had left, Mr. Donisthorpe managed in the two or three hours he had for working, before starting to catch a later train at Struan, to find *Quedius xanthopus*, Er.

Asparagus beetles in Canada.—In the report (On the experimental farms) for 1899, presented by Mr. W. Saunders to the Minister of Agriculture, there is included, as usual, an interesting report by the entomologist to the Department, Mr. James Fletcher, dealing with insect plagues of the year 1899, and the remedies suggested. It appears from this report that the two asparagus beetles—*Crioceris asparagi*, L., and *C.* 12-*punctata*—have at length worked their way up from the United States into Canada; in the former country they were introduced in 1856 and 1881 respectively, and since then have spread over the eastern states, often causing immense damage to the asparagus crops. Much injury was caused in the invaded districts of Canada last season, and it is to be feared they must now be expected as an annual plague to be watched for and guarded against. In this country we have only *C. asparagi*, and it does not appear to often occur in numbers sufficient to cause any serious injury to the asparagus crops.—T. Hudson Beare, B.Sc., F.E.S., King's Road, Richmond, Surrey. *September* 23*rd*, 1900.

Notes on the copulation of Hydrophilus piceus, L.—On August 14th, 1899, I took a dozen specimens of *Hydrophilus piceus* in Wicken Fen. I brought home several pairs alive and kept them in a glass bowl in my study, feeding them on cabbage, lettuce, vegetable marrow, &c., which they devoured greedily. All soon died off, except a single pair which have lived till this month, the ♀ dying on the 14th, having existed for over twelve months in captivity. I may mention that most of the others which died had one or both of their antennæ bitten off, the cause I suspect of their death, and the handiwork of this ♀. It was not till July 22nd of this year that copulation was noticed, when I then made the following notes. The anterior legs of the ♂ clasp the rim of the elytra of the ♀, with the large claws, about one-third from the anterior margin. The head rests on the middle of the back just below the scutellum, the intermediate legs rest on the back of the ♀, and the posterior legs are drawn up under the body. The ♂ rubbed the back and sides of the ♀ rapidly with the intermediate legs as if with the intention of exciting her, the posterior legs being moved at the same time and with sufficient force to jolt both beetles considerably, stridulating loudly. The stridulation of this beetle has not been recorded before. I was unable to ascertain how the noise was made. Mr. Gahan, who has paid considerable attention to the subject of stridulation in Coleoptera, and to whom I gave specimens of the male to examine, thinks that some small ridges he found on the underside of the pronotum may be the cause, though not like ordinary stridulating organs. The penis which is three-pronged, and very large, has to be bent round considerably to reach the female organ. It is first exserted and then as it is pushed out further it twists once completely round and is then further advanced till it reaches the female organ, untwisting again when it resumes its original position. True copulation (penetration)

was not noticed, as though the pair were observed for hours, the ♀ apparently would not allow the ♂ to accomplish the act. She tried hard to escape, swimming rapidly round and endeavouring to jerk the ♂ off, sweeping away the penis when in position with her posterior legs. The ♂ occasionally applied the claw of the posterior leg to the posterior part of the ♀. In this case the ♀ evidently exercised considerable choice, the ♂ being apparently distasteful to her. It is perhaps worthy of record as a case in favour of "sexual selection."—Horace Donisthorpe, F.Z.S., F.E.S., 58, Kensington Mansions. *September*, 1900.

ORTHOPTERA.

Orthoptera collected near Innsbruck.

By MALCOLM BURR, F.Z.S., F.E.S.

During a short stay in the hills above Innsbrück, towards the end of July last, I took a few species of Orthoptera. Undoubtedly the most interesting form taken is *Stenobothrus longicornis*, Latr. This species has hitherto only been taken in north central France, and in Belgium. Its occurrence in the Tirol shows that it only requires search, and careful discrimination from the closely allied *S. parallelus*, with which it is almost always confused. As has been before pointed out (*Ent. Rec.*, xi., pp. 244-245) it has been amalgamated by authors with its ally, and separated by Finot. It has since been shown by M. Lameere (*Ann. Soc. Ent. Belg.*, 1900, xliv., p. 7) to occur in Belgium. Its capture in the Tirol shows that it is widely distributed, and it is almost certain to be a native of this country. The collection works out as follows:

Forficularia: *Forficula auricularia*, L.—Amras (2070ft.), in the valley near Innsbrück.

Acridiodea: *Mecostethus grossus*, L.—Very numerous in a marshy field above Amras, at about 2600ft. *Chrysochraon brachypterus*, Oesk.—Fairly common about Igls (2900ft.). *Stenobothrus lineatus*, Panz.—Very numerous around Igls; less so on the Patscherkofel, up to about 5000ft., July 22nd. *S. nigromaculatus*, Kr.—One ♀ at Igls, July 23rd. *S. morio*, Fabr.—Fairly common around Igls. *S. apricarius*, L.—Common around Igls. *S. viridulus*, L.—Numerous on the Patscherkofel at about 4-5000ft. *S. rufipes*, Zett.—Fairly numerous around Igls. *S. bicolor*, Charp.—Common at Igls, Amras, and on the Patscherkofel. *S. biguttulus*, L.—One ♀ at Igls, July 23rd. *S. parallelus*, Zett.—Amras, Igls, common, var. *alis perfectis explicatis*, Igls, 1 ♂; Amras, 4 ♂ s, 1 ♀. This form, which is by no means common, was found with the following. *S. longicornis*, Latr.—Igls, 2 ♂ s; Amras, 4 ♂ s, 1 ♀; this species, referred to above, occurred in a marshy spot, together with the variety above mentioned of *S. parallelus*, *Locusta cantans* and *Mecostethus grossus*. It is instructive to find this form in exactly the same locality as the fully-winged variety of *S. parallelus*, which is a kind of intermediate form between it and the typical *S. parallelus*. The distinction, which is about as subtle as that between *S. bicolor* and *S. biguttulus*, is most noticeable in the ♀, where the valves of the ovipositor are very long and marked; the difference in the neuration which is slight, may well vary to some extent. *Gomphocerus sibiricus*, L.—Very numerous on the Patscherkofel at about 1500ft. *G. maculatus*, Thunb.—Common on the hills at the back

of Igls. *Stethophyma fuscum*, Pall.—Not very common on a restricted spot near Igls. Of the several specimens found only one was perfect. All the others, of both sexes, had the elytra and wings so mutilated, by some cause or another, as to be entirely useless; a certain number of *Acari* were found upon them. *Oedipoda caerulescens*, L.—Only very immature specimens, fairly common on the Lanserkopfe (3050ft.). *Podisma alpinum*, Koll.—The type form was very common on the Patscherkofel, just above Heilingwasser.

Locustodea: *Barbitistes serricauda*, Fabr.—One immature, Amras, July 24th. *Leptophyes alborittata*, Koll.—One immature ♂, Vill, below Igls, at about 2600ft. *Locusta viridissima*, L.—Common round Igls. *L. caudata*, Charp.—One ♀ near Igls, in grass by the roadside. I was unable to find the ♂, though I searched with some care. *L. cantans*, Fuessly.—Fairly common round Schloss Amras, and extremely so in a swampy clearing in the woods at a higher elevation. *Platycleis grisea*, Fabr.—Igls, not numerous. *P. roelesii*, Hagenb.—Common at Amras, in the fields; much less so at Igls. *P. brachyptera*, L.—One ♀ Igls. *Thamnotrizon apterus*, Fabr.—This fine insect was very numerous in a deep gorge near Innsbrück. I took it first a little below Vill, and from that point downwards it was common. *T. cinereus*, L.—Very common on the Lanserkopfe.

Gryllodea: *Gryllus campestris*, L.—The field cricket could be heard chirping, but we only took one specimen, and we were able to catch him as both his hinder tibiæ were missing.

SCIENTIFIC NOTES.

Cossus orc, Strecker, at the Tilbury dock.—In the last week of June, Mr. R. J. Theakston gave me a living specimen of what appears to be, from the single specimen in the British Museum collection, *Cossus orc*, Strecker, *Proc. Acad. Nat. Sci. Phil.*, 1893, p. 282, or a closely allied species. It is a female, and laid a fair number of unfertilised ova. He had obtained it from a workman who had it in a matchbox and was exhibiting it to a friend. Enquiry elicited the fact that it was taken among some wood that was being unloaded in the Tilbury dock, the wood having come originally from America. I have hitherto delayed noting the capture as inability to get to the Natural History Museum, South Kensington, since I became possessed of it, has prevented me from naming it. The eggs are very different from those of *Cossus ligniperda*, and one suspects a series of not very closely allied groups included in the *Cossidae* owing to the superficial similarity of the imagines and the somewhat allied habits of the larvæ.—J. W. Tutt, Westcombe Hill, S.E.

Glypta lugubrina, supposed to be parasitic on Hecatera dysodea.—I was yesterday searching lettuce heads for larvæ of *H. dysodea*, and, noticing numbers of the enclosed ichneumon on the wing, I watched them for nearly an hour. I never saw one in the act of stinging a larva, although there were several lying fully exposed, but I noticed many of them ovipositing in the flowers and seed-vessels of the lettuce plants themselves. Is this usual? I had always thought that ichneumons found some living host in which to oviposit, but though I opened several of the flowers and examined them under a glass, I could find no lepidopterous egg or larva of any

sort.—Percy C. Reid, Feering Bury, Kelvedon. *July 30th*, 1900. [The Ichneumonid you send is undoubtedly the species referred to *Glypta lugubrina*, of Holmgrèn (*Mon. Pim.*, p. 41), by Bridgman in *Tr. Nor. Nat. Soc.*, v., 71, since it is identical with specimens so named by him in my collection. He says (*l.c.* 68) that the central abdominal segments are less transverse and the mesopleura and metathorax are much more finely and sparingly punctate than in *G. mensurator*, Gr., with which Holmgrèn synonymises it. It is, however, probable that Bridgman later considered them identical, since he records only *G. mensurator*, Gr., from Norfolk, in 1893. Mr. Bignell has not met with it in South Devon, though I should suspect it to be widely distributed and not uncommon throughout the country. The *Glyptae* are, I believe, invariably parasitic upon micro-lepidoptera—generally upon *Tortrices*. *G. lugubrina* has been bred by Mr. G. T. Porritt from *Eupoccilia hybridellana*, and on the 13th of last July Miss Alderson kindly sent me from Worksop a ♂ *G. ceratites*, Gr., which had emerged during the morning of the 11th, ex. *Tortrix xylosteana*, fed upon yew. *G. lugubrina* (*lugnorina*, *sic*) is figured in *Knowledge*, v., 245. The specimen you send belongs to Holmgrèn's var. 1 = "Coxis rufescentibus fusco-maculatis, segmentis mediis abdominis lateribus rufis." I never heard of an Ichneumonid ovipositing in vegetable matter, and suspect the presence of an animal host despite the observations of Mr. Reid, with whom I have corresponded upon the subject.—Claude Morley.]

Change of colour in pupa of Apatura iris just before emergence.—When in the New Forest at the end of May last I became the fortunate possessor of two larvæ of *Apatura iris*, which were found by my brother feeding on *Salix caprea*. They fed up well on *Salix cinerea* which I had growing in my garden, and became pupæ, the first on June 15th and the second on June 17th. The imagines, both ♂s, emerged, the first on July 8th and the second on July 10th. Twenty-four hours prior to the perfect insect emerging the pupa changed in colour from a whitish-green to a most beautiful bluish-green. I cannot find any reference to this change in colour in any of the notes I have read on the pupa of *A. iris*, but presume it is usual.—A. Russell, F.E.S., Southend, near Catford, S.E. *August 28th*, 1900.

Habits of Colias hyale.—While on my holidays at Folkestone, August 11th-27th, I was very pleased to see *Colias hyale* turn up after a few years' absence. During my stay I took 41 specimens and saw over a hundred. I found their flight commenced about 9.30 a.m., and from then until about 1 p.m. I never observed them to settle at all. They flew very swiftly up and down the face of the cliffs, making it difficult to catch them. From 1 p.m. till about 3.30 p.m. their flight was much less strong, and they settled at intervals, and it was, therefore, much more easy to secure them, whilst after 3.30 p.m. I did not see any on the wing. I did not observe any to pair, although they would occasionally fight with the "common whites." One thing in particular I noticed with regard to their distribution, and that is, they seemed to occur more freely in one dip of the cliffs called "the horseshoe" (a nice sheltered cliff in the shape of a horseshoe) than elsewhere. Whilst the sun was gradually rising to its zenith *C. hyale* flew on the west side of the hollow directly opposite the sun; at noon they preferred the north side, whilst in the afternoon they shifted to the

east side. So constant was this that in the morning I saw them only on the west side, and particularly noted that I did not see one on the east, whilst at noon none appeared on the south slope, and in the afternoon they appeared only on the east side, the west being now deserted. In each case they preferred being directly opposite the sun. There was one hollow that led down to a field of sainfoin, whilst beyond this was a field of clover, and here I found that *C. hyale* distinctly preferred the sainfoin but *Colias edusa* (which was quite as common as *C. hyale*) preferred the clover. Of the latter species I also took a long series.—C. P. Pickett, The Ravenscroft, Columbia Road, Hackney Road, London, N.E. *August 30th*, 1900.

The systematic position of Nonagria brevilinea.—Why is this species—*brevilinea*—classed with *Nonagriidae*? The larva is not in the least like a Nonagriid larva, and I should say the insect is much more a *Leucania* than a *Nonagria*. Can anyone explain?—H. M. Edelsten, F.E.S., Forty Hill, Enfield. *August 2nd*, 1900. [We suspect that Mr. Edelsten is referring to the position out-of-date authors have given this species—Newman, &c.—but surely the Leucaniid affinities of this species are now well recognised. If Mr. Edelsten will refer to *The British Noctuae and their Varieties*, vol. i., p. 37 (1891), he will find the insect described as *Leucania brevilinea*, and in our little work *British Moths*, p. 135 (1896), we state: "*L. brevilinea* was supposed to be a *Nonagria* by Newman, but has since been determined to be a *Leucania*."—Ed.]

Note on the cry made by the larva of Acherontia atropos, L. —The plaintive cry that the imago of *Acherontia atropos* makes when disturbed is well-known, but entomological *savans* are not at all agreed as to the manner in which the cry is produced. Some consider it to be due to the rubbing of the tongue against the head, or of the palpi against the tongue. Others attribute it to air escaping by the stigmata from the base of the abdomen, or to the passage of air contained in a cavity of the head being liberated from the tongue. The following, if not a contradiction of the above theories, is at least a modification thereof. At the end of last July, M. Naniot sent me a fine larva of *A. atropos* to preserve for our forthcoming exhibition. What was our surprise, at the moment of operation, to hear this mysterious cry, common in the imago, made by the larva. On this occasion it appeared evident that the cry came from the buccal organs of the insect, and the larva seemed to open its mouth each time the cry was heard. A complete anatomical study of the larva ought to show us certainly if this noise is a true cry, analogous with those of the higher animals and which is made by the insect under stress of great excitement, or is only produced by the rubbing of one organ against another, a view scarcely admissible. Mr. F. Castin assures me that this cry is well-known to those who rear the larvæ but has not been explained, whilst Mr. F. Andernack read a note at the last meeting of the Société Entomologique de Namur, on the cry of the perfect insect.—L. J. Lambillion, 25 Rue Pépin, Namur, Belgium. *September 11th*, 1900.

Note on hybrid Clostera curtula × pigra and C. pigra × curtula.—The hybrid *C. pigra* ♂ × *curtula* ♀ would appear to be generally triple-brooded, at least, last year a number came out in October, and this year the larvæ have already pupated, and one can

reasonably expect a certain percentage of the imagines shortly. The hybrid *C. curtula* ♂ × *pigra* ♀ are, on the other hand, quite small larvæ at the present time and will not produce imagines, one suspects, until next year. Rearing these hybrids is very interesting work, and one observes several peculiarities in them, *e.g.*, both forms of the hybrids mentioned above laid ova within two or three days of each other, and the larvæ were thus available for comparison, when it was distinctly noticeable that the larvæ of *C. pigra* ♂ × *curtula* ♀ are very like those of *C. pigra*: they have fed up very quickly, as do the larvæ of *C. curtula*, whilst the larvæ of the hybrid *C. curtula* ♂ × *pigra* ♀ are also very like the larvæ of *C. pigra*, but they are feeding up slowly, like the larvæ of the latter species. It may be worth noting that whilst the larvæ of *C. pigra* ♂ × *curtula* ♀ are, as stated above, this year, very like those of *C. pigra*, they were in 1899 very like the larvæ of *C. curtula*. I had six pairings of *C. pigra* ♂ × *curtula* ♀ but only two of the females laid at all freely, the others laid from 12 to 20 ova each, and these were nearly all infertile. On the other hand I only obtained two pairings of *C. curtula* ♂ × *pigra* ♀, but both of these females laid freely, and most of them produced larvæ; the latter, however, are so small that one feels doubtful as to how many will reach maturity.—L. W. Newman, 41 Salisbury Road, Bexley, Kent. *September 19th*, 1900.

Triple-brooded and double-brooded species of Lepidoptera.—I have several partial third broods of various species now emerging: *Drepana hamula*, which appears to be always, in a state of confinement, triple-brooded, and *D. unguicula*, which is so to a less extent. With me a third brood of *Clostera curtula* always emerges in October or September, whilst *Pterostoma palpina*, *Notodonta ziczac*, and *Lophopteryx camelina* are always double-brooded, every pupa of *N. ziczac*, nearly all (some 150) of those of *P. palpina*, and more than half of those of *L. camelina*, having emerged in July, when pairings were obtained, followed by fertile ova and larvæ in due course, all having now pupated except a few *L. camelina*. I find these second-brooded larvæ feed up remarkably quickly, some being only 28 days from ova to full-fed larvæ. I suspect the hot weather that we experienced at the time influenced them largely. Last week two specimens of *Cerura bifida* emerged from cocoons which had only been spun up a little over a week, the first instance in which I have had late examples of this species.—Ibid.

VARIATION.

Gynandromorphous Dryas paphia ♂ and valesina ♀.—Following on our Editorial (*ante*., *p*. 242) concerning this fine gynandromorphous form, we may note that Weir records (*Entom*., xii., p. 206) a gynandromorphous *A. paphia* with the wings one side ♀ *valesina*, on the other side of the normal colour of the male. He also notes another example taken by Gulliver, the left wings ♂, the right wings ♀, but the upper edge of right forewing of the usual tawny colour, and one-third of the hind-wing also thus coloured, so that in the same specimen both gynandromorphism and dimorphism existed. Both were taken in the New Forest in July, 1880. The former was figured *Entom*., 1882., pl. i., fig. 5.—J. W. Tutt.

Variation of Cosmotriche potatoria.—I have bred a very fine series of *Cosmotriche potatoria* during the last season from larvæ found in this district. The males vary in colour from the typical form to very pale yellow, whilst some of the females are of a very peculiar shade of straw colour.—F. Glenny, F.E.S., The Orchard, Walsoken, Wisbech. *October 18th*, 1900.

Aberrations of Erebia æthiops.—I spent three days, August 6th, &c., after *Erebia aethiops* this year, and I now have a fine series, and am very much interested in the many aberrations and varieties it presents. I was fortunate enough to get one ♀ with six ocellated spots on the forewings and some fine ab. *ochracea*; in fact, the latter far outnumbered the type. I also obtained some dark males and females with scarcely any bands, only rings round the spots.—H. Mousley, F.E.S., 10, Selborne Terrace, Bradford. *August 30th*, 1900.

Rearing the red aberrations of Tæniocampa gracilis.—It may interest some lepidopterists to know that I have this year reared a few *Taeniocampa gracilis* from eggs laid in captivity last year by moths hatched from larvæ taken in the New Forest the year before. Those emerged this spring are of the red New Forest form, and the dark colour has persisted in spite of the insects being reared for a generation away from their natural home, and not on their natural food. I had always expected this would occur, but some entomologists have expressed a contrary opinion, and have averred that the darker coloration was simply caused by the food-plant (*Myrica gale*), and that if they were reared on dock, &c., they would revert to the pale greyish colour. This has now been proved not to be so.—W. M. Christy, M.A., F.E.S., Watergate, Emsworth.

Triphæna janthina var. latimarginata, Röber.—As this is a species little liable to variation in Britain, the following description of a well-marked local race from Germany seems worthy of translation and reproduction in the *Record*. The original description will be found in the *Entomologische Nachrichten*, vol. xxvi., July, 1900, p. 204:

"Of this new Noctuid variety from the Harz, eleven picked examples lie before me. They are, without exception, somewhat smaller than equally picked specimens of the typical form, as figured in Hofmann's work ('Die gros.-schmett. Europas,' 2nd edit., 1894, pl. 32, fig. 7). The forewings are darker, and the orbicular and reniform spots are more sharply marked; the hindwings are on the upper and under side of a deeper yellow, the black margin is much broader and continued on the upper side both on the costa and on the inner margin to the black base, so that in most specimens there is only a spot of yellow colouring left on the upper side. The fringes of the hindwings are in most specimens blackish at the apex and more striking than is the case in many examples of the type. On the underside of the forewings the inner portion is intensely black and the outer edge a darker yellow, in many specimens reddish-brown. The body is on the upper side darker and on the under side a deeper yellow."

T. B. Fletcher, F.E.S., 78, Thornlaw Road, West Norwood, S.E.

A yellow aberration of Noctua castanea.—I have found *Noctua castanea* a very uncertain insect at sugar. In ten seasons I have only had one in which the species came regularly to sugar all through, *viz.*, in 1891. That year I took with Mr. Bowyer, of Haileybury, eight or nine of the yellow form, but up to this year I have never seen it again. This year, from August 13th-18th, the species came freely to sugar and I got at first about 30 or 40 a night, and on each night, except the 16th, one yellow one. On the 19th the weather became colder and the ling blossom became attractive, and during the next week nothing came to

sugar at all. Our most numerous form is the red, some being very dark, and even the grey ones have a pink tinge. I have never here seen the grey form, common in the New Forest without a trace of pink in it, nevertheless here and, as far as I can learn, nowhere else, occurs the entirely distinct and most striking yellow form. The nearest yellow to it in an insect that I can find is that of a male *Euthemonia russula*. I should be much obliged if any lepidopterist would tell me if he knows of its occurrence anywhere else.—F. C. Woodforde, Market Drayton, Salop. *September 3rd*, 1900. [We know no form of this species that in any way agrees with Mr. Woodforde's description. In *British Noctuae and their Varieties*, vol. ii., pp. 104-105, we describe, besides the type—*castanea*, Esp.—var. *neglecta*, Hb., var. *laevis*, Haw., and var. *pallida*, n. var. The latter has a distinct ochreous tint in it, it is described as "whitish-ochreous" but is rather "greyish-ochreous." This and a form from Morpeth—grey in tint, with quite grey (not red or reddish) fringes we consider to be the rarest forms we know. Our ignorance of the distribution of the rarer forms and races of the Noctuids is so profound that they really may be not at all rare if more lepidopterists would carefully examine their series and report as to the distribution of the various forms.—Ed.]

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Note on Glyphipteryx equitella.—On April 21st, 1900, I searched the patches of stonecrop (*Sedum acre*) growing on the top of a wall here, and found one larva of *Glyphipteryx equitella*. Four days later I took several more in the same place. They were found generally head downwards in the interior of the shoots of the stonecrop, but one or two rested with the head in the top of the shoot. The attacked shoots appear grey instead of green on account of the larva eating out the interior and leaving only the cuticle of the leaves. These hollow leaves remain in position after the larva has left the shoot, being held together, I believe, by the silk spun by the larva. An entirely grey shoot is often tenantless, but a shoot with two or three grey leaves is almost sure to contain a larva. I have not yet found a larva on the outside of the plant, but from the ease with which they burrow into a fresh shoot, I imagine they sometimes change their abode. This is effected possibly at night. The larvæ appear to be of two types, the first, which I presume is the female, is larger and of a brighter yellow than the other variety. In the latter (the male (?) larva) are two conspicuous purplish bodies, which I take to be the testes situated in the dorsal area about the 5th abdominal segment. In order to breed this species it is a good plan to keep the *Sedum* containing the larvæ in an air-tight vessel. As soon, however, as the larvæ come out of the shoots to pupate they should be placed in a drier situation and furnished with pieces of cork or other material of which they can make use in forming their cocoons. As I did not adopt this plan till some pupæ were attacked by mould, and as I sent several of the caterpillars away, I only bred two imagines. These both appeared on the morning of June 16th.—Alfred Sich, F.E.S., 65, Barrowgate Road, Chiswick, Middlesex. *October 25th*, 1900.

Eggs of Lepidoptera.—*Cleogene lutearia*.—Oval in outline, with one end rather broader than the other; pale yellowish-grey in colour

when first laid, surface very shiny, and (with a two-thirds used as a hand lens) looks almost smooth; a faint reticulation, however, is visible, but a higher power is needed to make out the nature thereof. (Described August 4th, 1899, from eggs laid quite loosely on the same day by a female captured at Simplon.)

Emydia candida (? *cribrum* var.).—Rather more than half a sphere; the surface very finely and minutely reticulated; not very shiny; colour orange-yellow; the micropylar area does not appear to be even slightly depressed [Laid (and described) August 4th, 1899, side by side in short regular rows, by a ♀ caught at Simplon]. On the 6th they had become reddish-brown, and by the 7th purplish-brown; the surface very bright and shiny; by the 9th the darkening had increased, having become chocolate-brown in tint, whilst the surface shone like silver; a small circular apical area represents the micropyle, and forms a minute rosette, which has not the same polish as the rest of the surface of the egg.

Lithosia griseola.—An unfertilised egg of *L. griseola*, received from Mr. Bacot, is dark reddish-brown in colour, the surface strongly pitted at the shoulder, becoming regularly reticulated polygonally below the shoulder, with a deep apical micropylar depression, at the bottom of which is a minute central cellular structure (the micropyle), surrounded by radiating lines, extending up the sides of the depression.—J. W. Tutt.

Hylophila prasinana.—1·0mm. in diameter, almost exactly or all but a hemisphere, very similar in shape to the egg of an *Acronycta*. When laid very pale greenish or colourless and quite transparent. At the summit is the micropylar cup 0·13mm. in diameter very nearly smooth, but with a central cell surrounded by a circle of petals reaching very nearly half-way to margin of cup. The margin of the cup is a raised ridge, rather sharp, formed by the first circle of secondary ribs, and is thus seven or eight angled. From the seven or eight angles start the primary ribs to the egg margin. Inside the rim of the cup a few lines of ribbing can be made out but so faintly that the impression that the interior of the cup is smooth is nearly correct. The ribbing is doubled at once by an intermediate rib arising from the centre of the first secondary rib below the cup. The seventh secondary rib, below this again starts another intermediate rib, so that if there were seven primary ribs at the top, these would become 14 and then 28. As a matter of fact there is some variation. A specimen actually counted as 13 and not 14 and in another 32 marginal ribs counted. There may be more or less than 7 ribs starting at the top and these do not always afford a new rib in the interval. Half-way down the egg however, when the 14, became 28, there is almost absolutely no variation in the intermediate rib being found. The secondary ribs towards the margin below the last increase of ribs are 7 and then follows a slightly swollen flange in which the egg rests, this is part of the egg and not a gluey extraneous material. The primary ribs are high and very sharp, the valley between them hangs in a catenary curve to a depth of about one-third its width, the secondary ribs are equally sharp, crisp, narrow, but hardly rise above the surface. When the egg matures it becomes yellowish and separates from the shell sufficiently to have a colourless marginal zone, whilst the top of the egg down to the marginal ribs becomes of a rich chocolate-brown, with

irregular margin and numerous spots of the basal egg colour. The ribs show up bright and glittering over this, and the micropylar rosette becomes much more evident and can be counted to contain about 15 petals. In another specimen when the margin was raised a little from the surface, 10 secondary ribs were counted from last added ribs to base, and below this two more secondary ribs appeared, but without the primaries being at all raised though present.—T. A. Chapman, M.D., F.E.S., Reigate.

NOTES ON COLLECTING, Etc.

Lepidoptera at Boscombe and in the New Forest.—I collected assiduously during June and July, and went out nearly every day, whilst several day excursions were made to Brockenhurst, Lyndhurst, Holmsley and Ringwood. I went in strongly for larva-beating in May and June, and took among other things—*Lymantria monacha*, *Cymatophora ridens*, *Cleora lichenaria*, *C. glabraria*, *Apatura iris* (one), *Zephyrus quercûs*, *Nola strigula*, *N. cucullatella*, *Hylophila quercana*, *Sarrothripa revayana*, *Poecilocampa populi*, *Catocala sponsa*, *C. promissa*, *Drymonia chaonia*, *Boarmia roboraria*, *Hemithea thymiaria*, *Emmomos angularia*, *Lithosia quadra*, &c. Day-collecting in the New Forest produced *Lithosia aurcola*, *L. mesomella*, *L. helvola*, *L. complana*, *L. complanula*, *L. rubricollis*, *Enistis quadra*, *Calligenia miniata*, *Eulepia cribrum* (not so plentiful as usual at Ringwood), *Nemeobius lucina*, *Cyaniris argiolus*, *Macaria alternata*, *M. liturata*, *Acidalia bisetata* (two or three good aberrations) *Eupisteria heparata*, *A. emarginata*, *Corycia temerata*, *C. taminata*, *Zonosoma porata*, *Z. punctaria*, *Z. trilinearia*, *Z. omicronaria*, *Eurymene dolobraria*, *Epione advenaria*, *Cochlidion limacodes* (these were swarming for about five minutes, and then entirely disappeared—Is this usual ?), *Tephrosia extersaria*, *Hadena contigua*, *H. genistae*, *Erastria fuscula* (common) *Stauropus fagi* (one ♀), *Boarmia roboraria*, *Nola strigula*, &c. I had two or three week ends also at Lyndhurst with Mr. Finzi, and tried sugar every night, but the result was nil. I have also tried it here, and got absolutely nothing. Light is very good but I am severely handicapped with my moth-trap, owing to the gaslamps in the neighbourhood. I had one day at Swanage and took a few *Thymelicus actaeon*, *Melanargia galathea*, &c. On picking some apple-blossom for table decoration, I found a larva of *Porthetria dispar* which Dr. Crallan identified for me and now has. *Colias edusa* was seen several times in June, also *Pyrameis cardui*, so I suppose it will be an "*edusa* year" (I took a ♀ last autumn at Christchurch). Since July, there has been little to report; sugar has been an utter failure, and light but little better, the only insect appearing in any quantity being *Luperina testacea*, of which I obtained some nice black aberrations. *Acidalia ochrata* was taken near Bournemouth on July 19th, and *Papilio machaon* seen September 1st, both new to the Bournemouth list. *Caradrina ambigua* is very scarce this year (only seven taken) whilst *Agrotis obelisca*, *Triphaena subsequa*, *Leucania albipuncta*, *Agrotis puta*, &c., species which occurred in my garden last year, have been entirely absent. *Euranessa antiopa* was seen at Holmesley one day last week by a porter and chased down the line, but he failed to catch it.—(Major) R. B. Robertson, Forest View, Southborne Road, Boscombe. *September 13th*, 1900.

Lepidoptera at Market Drayton.—Following up my notes (*ante.*, pp. 269-271) I may add that insects since the middle of June have been more numerous than I ever remember to have seen them before. On June 20th an hour's walk in the woods produced nearly 50 *Macaria notata*, whereas in ordinary seasons ten per hour is a fair average. Unfortunately half of them were a little worn. On the 23rd, in another wood, a couple of hours resulted in 40 *Asthena sylvata*, a dozen in a day being my previous maximum. *Venusia cambricaria* and *Eupithecia debiliata* have been unusually numerous, as also *Acidalia fumata*. Noctuids were abundant at sugar on the only two occasions tried, *viz.*, on June 20th, when *Aplecta tincta* was the most numerous species, and again some three weeks ago when *Xylophasia monoglypha* was beginning to swarm. Last Saturday, I tried a duplex lamp in a peat moss. *Acidalia immutata* swarmed at it, but were a little worn, and among others two *Geometra papilionaria*, one *Leiocampa dictaeoides*, and one *Drepana falcula* were attracted, Noctuids only waltzed around without coming within reach. Insects have come out well in the breeding-cages, especially *Cymatophora duplaris* and *Notodonta dromedarius*, also *Zonosoma porata*, of which species every pupa produced an imago. Some species are very late. Many larvæ of *Cucullia chamomillae* are now only about an inch in length; those of *Plusia iota* and *P. pulchrina* are unusually scarce, whilst those of *Habrostola triplasia* are more abundant than usual and I secured ova. Two large black examples of *Amphidasys betularia* paired in the breeding-cage, and I have now about 500 larvæ feeding.—F. C. Woodforde, Market Drayton. *July 24th*, 1900.

Lepidoptera in the Norfolk Broads.—I have just returned from Norfolk, where I have made three short stays; the first in mid-June was not very productive, and *Senta ulvae*, my chief quarry, was scarce, as the nights were unfavourable to its flight. *Arsilonche alborenosa*, *Meliana flammea*, *Spilosoma urticae*, *Leucania pudorina*, *Hydrelia unca*, *Phibalapteryx lignata*, &c., were the species that came to light. In the first week of July thunderstorms so cooled the air that absolutely nothing but gnats (of the most venomous kind and formidable size) flew at dusk or to light. *Hyria auroraria* occurred by day, but the wind was too high to make it worth looking for. The last visit at the end of July and beginning of August produced some good nights, and *Leucania brevilinea*, *Lithosia muscerda*, *Nonagria cannae* (pupæ) have rewarded persistent working at last.—E. A. Bowles, M.A., F.E.S., Myddelton House, Waltham Cross. *August 9th*, 1900.

Lepidoptera in Westcombe Park.—Two species struck me as being exceptionally abundant from July 20th-28th in Westcombe Park, *viz.*, *Cyaniris argiolus*, second brood, which often flew about the waste ground like *Polyommatus icarus*, and *Hecatera serena*, which came into the gas-lights night after night. The beautiful little *Pyralis fimbrialis* also came in to light freely.—J. W. Tutt.

Lepidoptera at Castle Moreton.—The season here has been a very late, but at the same time a fairly good one. Geometrids in June were abundant, *Minoa euphorbiata*, *Zonosoma omicronaria*, and *Asthena luteata* being much more common than usual, whilst such species as *Acidalia remutata* and *Asthena candidata* were almost a nuisance. In July insects came rather freely to light. It is perhaps worthy of note that *Cidaria dotata*, usually scarce here, was abundant, whilst on the

other hand *Cidaria pyraliata*, generally common, was only conspicuous by its absence, and up to July 16th, when I left home, sugar was never really productive, although several species put in an appearance occasionally, some of which I had not seen for years; among other species there appeared *Aplecta advena*, *Craniophora ligustri*, *Hecatera serena*, *Hadena genistae*, *Mamestra anceps*, *Noctua festiva*, and *Agrotis corticea*. Normally common species such as *Agrotis exclamationis*, *A. segetum*, *Miana strigilis*, *M. fasciuncula* and *M. furuncula* were very scarce.—(Rev.) E. C. Dobrée Fox, M.A., Castle Moreton, Tewkesbury. *August* 31*st*, 1900.

Lepidoptera near Salisbury.—Collecting in the Salisbury district was much more interesting than usual this year because of the capture of two new insects. On August 5th, my son found a fine *Acherontia atropos* larva on a kidney-bean stalk, resting. On the 7th he found another, on potato; on the 15th several more in different gardens and allotments, and another was brought in from a bean stalk. On the 15th my son netted two fine specimens of *Colias hyale*, and also took *C. edusa* in a valley between two high spurs of the downs. On the 16th two more were taken, and two on the 23rd, all in perfect condition.—(Mrs.) M. E. Cowl, Aberceri, Spencer Park, Wandsworth Common. *September* 20*th*, 1900.

Acherontia atropos at Carnforth.—The larvæ of *A. atropos* have again been very common in this district, nineteen larvæ, two pupæ, and two imagines having been brought in by boys, and I had larvæ, pupæ, and imagines, all alive at the same time. I was unfortunately unable (owing to a broken ankle) to look for them at the time, but I suspect that, had they been searched for systematically, a large number might have been taken. I heard of many being killed, and one lady, fearful that a larva in her garden should sting some one, despatched it with the tongs.—H. Murray, Carnforth. *September* 22*nd*, 1900.

Acherontia atropos at Sandwich.—A friend gave me a crippled imago of *Acherontia atropos* on September 21st, which had emerged the preceding day from a pupa, the larva of which he had fed up. The larvæ appear to have been very plentiful in the district this year.—C. W. Colthrup, 127, Barry Road, East Dulwich, S.E. *Sept.* 22*nd*, 1900.

Acherontia atropos in the Mucking district.—This species has been somewhat freely taken as larva and pupa this year about Mucking. I have not bred a specimen yet, but hope to do so before long. Two larvæ were brought in which had been found feeding on *Lycium barbarum* in hedges. This is the first occasion amongst the hundreds which have passed through my hands, on which this has been the food-plant although stated to be so by Stainton and others.—Rev. C. R. N. Burrows. *October* 3*rd*, 1900.

Sphinx convolvuli and Acherontia atropos at Weymouth.—I have had one specimen (imago) of *Sphinx convolvuli*, and several larvæ of *Acherontia atropos* brought me this year.—N. M. Richardson, B.A., F.E.S., Monte Video, Weymouth. *October* 10*th*, 1900.

Acherontia atropos in Cambs.—*Acherontia atropos* has been exceptionally abundant here this year. Up to the present I have quite 150 pupæ—I suspect a quite unusual number for a collector to get in one season. Which is the best way to force the pupæ? At present I am keeping them in a moist heat of 80°F.-86°F.—F. Glenny, F.E.S., The Orchard, Walsoken, Wisbech. *October* 18*th*, 1900.

Note on the abundance of Papilio machaon in Northern France.—About a mile from the cliffs near Le Portel, a fishing village west of Boulogne, in the midst of farm land, where the wheat had nearly all been carried, on August 19th last, I came across two patches of vetches and one of clover, where all the butterflies of the neighbourhood seemed to be congregated, chiefest of which was *Papilio machaon*, and in numbers sufficient to be called abundant. Although strong on the wing, they were not flying so wildly as one usually experiences, and their flight being over a restricted area, the chances for netting were thereby increased. At one time I had four around me within striking distance, I caught neither, though I eventually bagged five. I do not think they were bred in the immediate neighbourhood; the land lies high, with no indication of marsh; everything was parched, hardly a green leaf even on garden trees—they were probably immigrants. With regard to those specimens which have been either seen or taken in the southern counties this summer, the suggestion that they had rather crossed the channel from the continent than made their way southward from the Fens seems to me the more reasonable. May they visit us a little oftener? A few hours with *machaon* anywhere marks a red letter day, and the sport they afford does one good even to remember.—Harry Moore, F.E.S., 12, Lower Road, Rotherhithe. *October* 1*st*, 1900.

Papilio machaon at Catton.—A young entomological nephew writes me, that while playing in a cricket match at Catton, Norfolk, on September 8th, 1900, *P. machaon* flew over his head. As he has seen and taken a great number in the south of France he would not be mistaken in the species.—Jos. F. Green, F.L.S., F.E.S., West Lodge, Blackheath. [Other examples are recorded from East Grinstead, August 20th (Frohawk); near Martley, August 31st (Frohawk); Teme Valley, August 31st (Edwards).—Ed.].

Choerocampa nerii near Weymouth.—A specimen of *Choerocampa nerii* was brought to me alive in a cardbox on September 24th last, by a little boy, and, strange to say, was almost uninjured. It was caught at rest by Mrs. New, a resident in the village of Chickerell, about half a mile distant from my house, who, knowing my tastes, kindly sent it to me. It is a beautiful specimen, a female, and $4\frac{3}{4}$ inches across the wings. This is the first hawk moth, rarer than *Acherontia atropos* or *Sphinx convolvuli* that I have either caught or had brought to me during 30 years' collecting.—Nelson M. Richardson, B.A., F.E.S., Monte Video, near Weymouth. *October* 10*th*, 1900.

Choerocampa nerii in Kent.—A fine female of this rare species was captured by Master Guy Wickham, in his father's dining-room at Willow Grove, Yalding, about 6.30 p.m. on September 18th last. The window was open and a lamp burning on a sideboard at the far end of the room; there were some plants of *Nicotiana affinis* in the garden outside. Unfortunately it was very much damaged, as the boy had only a small "sea-side" net and no killing-bottle, so the moth took a deal of hunting before it was caught, and had to be killed like a butterfly by severe pinches under the thorax!—(Capt.) S. J. Reid, F.E.S., Yalding, Kent. *October*, 1900.

Heliothis scutosa and Aplecta occulta in South Devon.—Whilst I was collecting with my son, F. Capel Hanbury, in a clover-field near Dartmouth, on September 4th, a much worn male specimen of *Heliothis*

scutosa flew up from the ground, eluded us for a time, and was eventually taken by my son whilst buzzing among the clover. *Aplecta occulta* was taken by me on August 31st, whilst sugaring on the coast at some little distance from any woods, in the company of Mr. Eustace R. Bankes. I am not aware that this species has hitherto been recorded from any of the south-western counties of England, and it appears to be at all times very rare in the south. The specimen being a female, and the southern form much paler than the Scotch specimens, I determined to sacrifice it on the chance of getting eggs. I kept her in a muslin sleeve, and well fed for about a week, and she laid about 200 eggs. Unhappily they have proved to be infertile, and the specimen is of course worn almost past recognition.—Frederick J. Hanbury, F.L.S., F.E.S., Stainforth House, Upper Clapton, N.E. *September 24th*, 1900.

Pachythelia villosella two years in larval stage.—You will be interested to know that three of my larvæ of *Pachythelia villosella* are still on the move, though now inclined to hybernate, I have had these larvæ since May, 1899.—(Mrs.) M. E. Cowl. *September 20th*, 1900.

Dianthœcia capsincola emerging as a second brood.—In July I collected some larvæ of *Dianthoecia capsincola* in Yorkshire, feeding in seed-heads of campion. These were kept in a cool passage, and three emerged on July 19th, 21st and 24th. Is not this unusual, as both Newman and Stainton give the following August (and June) as the time for the imago? The same thing occurred last year, but as I was not expecting them I did not note the exact dates of emergence.—Douglas H. Pearson, Chilwell, Notts. *September 4th*, 1900. [We suspect 90 per cent. of the pupæ of *D. capsincola* go over the winter and emerge the following June. A few of a brood will often emerge after being pupæ only some two or three weeks.—Ed.]

Acanthosoma hæmorrhoidale in London.—My friend Mr. Malcolm Burr has been good enough to give me a specimen of *Acanthosoma haemorrhoidale*, Linn., captured by Mr Hubert Roose in the School of Mines. I have taken this species from birch on Wimbledon Common, but otherwise I do not know of any records from the London district nearer than Esher and Epping Forest.—G. W. Kirkaldy, F.E.S.

Breeding Œnistis quadra.—This has been a "*quadra*" year in the New Forest. It has fallen to my lot to breed 21 specimens out of 25. The remarkable point about them is that they all came out nearly together. On July 15th, five ♀s and one ♂; on July 16th, three ♀s and three ♂s; on the 17th, five ♂s; on the 18th, two ♂s; and on the 19th, two ♂s. They did not seem particular as to the time of the day at which they emerged, but the bulk of them came out early in the morning.—J. C. Moberly, M.A., F.E.S., Woodlands, Bassett, Southampton. *September 28th*, 1900.

Rumia luteolata in September.—At 10 a.m. in the Court woods, Clevedon, on September 13th, I observed a fresh specimen of *Rumia luteolata* at rest in the path, and, in the same woods two days later, Mr. Mason and myself watched two more specimens fly from the underwood which we were beating. I never saw specimens of the autumn brood before.—C. J. Watkins, F.E.S., King's Mill House, Pa'nswick. *October 8th*, 1900.

Catocala fraxini at Eltham.—A specimen of *Catocala fraxini* was taken on treacle at Eltham, Kent, on September 3rd, 1900, by

Mr. G. Grey and his brother, both members of the North Kent N.H. and Scientific Society, and was exhibited at the last meeting at the Polytechnic, Woolwich.—A. S. Poore, 47, Griffin Road, Plumstead. *October 17th*, 1900.

Macroglossa stellatarum at Ilford and Wimbledon.—On September 29th I saw a specimen of *M. stellatarum* on the wing at Ilford, and on October 1st two others at the same place, whilst on October 2nd I noticed three specimens between Wimbledon and Raynes Park.—C. P. Pickett, 52, The Ravenscrofts, Columbia Road, Hackney, N.E. *October 4th*, 1900.

Autumnal emergence of Macroglossa stellatarum.—Yesterday morning, October 22nd, I discovered a newly-emerged specimen of *Macroglossa stellatarum* just inside my drawing-room window, which was opened about three or four inches, I have never before seen one of these insects in Paddington but suppose they do occur here as in most places.—Hubert C. Phillips, M.R.C.S, F.E.S., 262, Gloucester Terrace, Hyde Park, W. *October 22nd*, 1900.

Cucullia absinthii in North Devon.—I discovered a few larvæ of *Cucullia absinthii* on *Artemisia absinthium* at Lee, and a single larva of the same species at Croyde. I had previously searched for the larva at Croyde on its food-plant, for a number of years, but without success.—C. Bartlett, 18, Henleaze Avenue, Westbury-on-Trym, Bristol. *October 2nd*, 1900.

Habits of the female of Stilbia anomala.—What are the habits of the female of this species? By diligent searching for this sex at Saunton, north Devon, on the gorse, heath and grasses upon which the insect rests, I was able to secure only one specimen, whereas some fifty males were netted or seen, the latter at rest, or flying from about 10 p.m. during the first week of September.—Ibid.

Colias edusa and C. hyale in 1900.—On June 17th, I saw several specimens of *Colias edusa* in north Cornwall.—S. G. Hills, Folkestone. *September 1st*, 1900.

From August 15th, *Colias edusa* has been plentiful in the neighbourhood of Folkestone, of the var. *helice* I have only captured two specimens.—Ibid.

On June 12th a specimen of *Colias hyale* was captured at Folkestone by Mr. W. S. Judge. Since August 16th *C. hyale* has been abundant in the same neighbourhood. Those I have taken show a great deal of variation, one or two specimens being without any spotting on the apex of the forewings.—Ibid.

Colias hyale appears to be widely distributed in Kent this autumn, and was in fine condition from August 15th to September 1st.—L. W. Newman, 41, Salisbury Road, Bexley, Kent. *September 2nd*, 1900.

Between August 22nd and 25th, especially on the 24th, *Colias hyale* was extremely abundant in lucerne fields between Birchington-on-Sea and Westgate. It would not have been difficult to have captured over a hundred specimens, or perhaps double that number. I only kept two dozen myself, whilst a young companion captured between three and four dozen. During the same period about half a dozen *Colias edusa* and the same number of *Pyrameis cardui* also appeared. On August 31st I captured one *Colias edusa* at Kingsdown, near Walmer, and saw one specimen of *C. hyale*.—Hubert C. Phillips, M.R.C.S., F.E.S., 262, Gloucester Terrace, Hyde Park, W. *September 2nd*, 1900.

In the *Daily Graphic* of August 25th Mr. J. E. Whiting (writing from Hampstead) records that on August 20th he took, in less than three-quarters of an hour, near Croydon, 20 specimens of *Colias edusa*, of which 15 were var. *helice*. We suspect Mr. Whiting cannot distinguish between *C. hyale* and *C.* var. *helice*.—Ed.

I saw two male *Colias edusa* yesterday flying in a lane near Alne about 12 miles north of York.—S. Walker, York. *September 7th*, 1900.

Colias edusa has been and is still fairly common; I have also taken one *C. hyale* and others have also been captured as well as *C.* var. *helice*.—(Major) R. B. Robertson, Forest View, Southborne Road, Boscombe. *September 13th*, 1900.

On September 3rd, I saw *C. edusa* at Christchurch, Hants, and on September 16th, at Parndon, in Essex.—A. Bacot, Bow House, Clapton, N.E. *September 18th*, 1900.

Whilst in northern France during August I saw several examples of *Colias edusa*, particularly between Grandville and Avranches, on two separate cycle journeys. Others, again, were seen when I made a circuit *viâ* Coutances. They were never in any great numbers at any one place, but were seen flitting along by the roadside, much as *Gonepteryx rhamni* does in Kent; I did not, however, have the opportunity of going into the fields, where they may have been much more abundant.—H. Alderson, F.E.S., Hilda Vale Road, Farnboro', Kent. *September 20th*, 1900.

A number of specimens of *Colias edusa* and *C. hyale* have been recently caught here, *C. hyale* being more plentiful than *C. edusa*.—Edward Ransom, Sudbury, Suffolk. *September 20th*, 1900.

Colias hyale and *C. edusa* have both been noticed in the clover fields around Chislehurst. I saw a specimen of the former on the golf links just outside my garden.—A. Robinson, B.A., Sylvanhoe, Chislehurst. *September 18th*, 1900.

I have seen *C. edusa* sunning itself in my garden, but did not disturb it.—J. C. Moberly, F.E.S., Woodlands, Basset, Southampton. *September 20th*, 1900.

While travelling yesterday by train from Lille to Paris, I several times noticed *Colias hyale* dashing about on the railway banks, from which I gather that this butterfly is this year numerous over here, as in England.—Jos. F. Green, F.L.S., F.E.S., Hotel Continental, Paris. *September 21st*, 1900.

I have not personally seen anything of *C. edusa* species in Cumberland this season, but a friend of mine at Maryport writes that one has been taken there and another seen.—F. H. Day, F.E.S., Carlisle. *September 22nd*, 1900.

There have been many *Colias edusa* in the Carnforth district during the last month; one male was captured in the street this week and brought to me. It is some time since the species was taken here.—H. Murray, Lowbank Villas, Carnforth. *September 22nd*, 1900.

It may be interesting to note that we have taken three *Colias hyale* and two *C. edusa* here, in our own field, within the last fortnight. Both species appear to be fond of settling on the blossom of *Centaurea nigra*. *C. edusa* is always scarce in this district and we have not taken *C. hyale* before.—(Miss) E. Miller, The Croft, Rainsford Road, Chelmsford. *September 24th*, 1900.

At the meeting of the Nonpareil Society, on September 20th, Mr. Bates stated that he took twenty-four examples of *Colias hyale* in a lucerne field between Dagenham and Hornchurch, in Essex, during the second week of August. Mr. Lusby at the same time reported several *C. hyale* at Gravesend during August.—C. P. Pickett, 52, The Ravenscrofts, Columbia Road, Hackney Road, N.E. *September 24th*, 1900.

Colias edusa has been common at Oxton with the ab. *helice* occurring fairly frequently, about one in ten; also one *C. hyale*, which almost escaped notice as a poor *helice*.—E. F. Studd, M.A., F.E.S., Oxton, near Exeter. *October 5th*, 1900.

Colias edusa has been abundant in the neighbourhood of Braunton and Morthoe this summer.—C. Bartlett, 18, Henleaze Avenue, Westbury-on-Trym, Bristol. *October 2nd*, 1900.

I saw a specimen of *Colias edusa* at Chippenham, Wiltshire, on September 24th.—Ibid.

I captured two male *Colias hyale* on August 12th on the Old Fosse Road, near Cotgrove, Notts, whilst a few days later four other examples were captured in the same locality. On the same date (August 12th), and in the same place, I also took 19 *C. edusa*, whilst a few days later a friend took 53, other captures bringing the total up to 80. The weather was generally sunny, with the wind westerly.—G. Henderson, 57, Arnold Road, Old Basford, Notts. *October 4th*, 1900.

On August 19th last I watched with great delight two specimens of *Colias edusa* flying about in a clover field near Painswick. I had not observed this interesting species here for many years. I may add, that the common Pierids are still in evidence and have been seen in our garden as late as yesterday, October 8th.—C. J. Watkins, F.E.S., King's Mill House, Painswick. *October 9th*, 1900.

PRACTICAL HINTS.

Field Work for November.

By J. W. TUTT, F.E.S.

1.—From the saltmarshes at Southend and Canvey I obtained, during the autumn and winter months, larvæ of *Coleophora salinella* on *Atriplex portulacoides* and *Suaeda maritima;* those of *Coleophora tengstroemella* on *Chenopodium;* of *Coleophora artemisiella* on *Artemisia maritima;* of *Semasia rufillana* in seed-heads of *Daucus carota;* of *Conchylis francillonana* and *Argyrolepia zephyrana* in the stems of *D. carota;* in the heads of teasel, larvæ of *Eupoecilia roseana* and *Penthina gentiana* were abundant; larvæ of *Conchylis dilucidana* in the stems of wild parsnip; *Gymnancyla canella* on *Salsola kali;* cases of *Coleophora argentulella* plentifully on seed-heads of yarrow, whilst the larvæ of *Dichrorampha petiverana* were in the roots. All these in due course produced imagines (Elisha).

2.—Machin used to breed *Conchylis dipoltana* from seed-heads of yarrow collected at Southend in the autumn.

3.—The slight earthen cocoons of *Eupithecia abbreviata* are sometimes spun at the root of a hawthorn tree where they may be found during the winter.

4.—The pupæ of *Hybernia leucophaearia* are usually found at tree-roots among tufts of grass.

CURRENT NOTES.

In the *Ent. Mo. Mag.*, for October, 1900 (p. 230), Dr. Sharp has some notes on "Some undescribed species of *Trogophloeus* with a new Genus." In these notes he describes a species new to Britain taken by Mr. J. H. Keys, near Plymouth, and for which he proposes the name of *T. anglicanus*. He mentions that M. Fauvel who has seen the species, is of opinion that it is identical with a species *T. unicolor* found in New Zealand. This is undoubtedly the case, as we have examined specimens at the British Museum, shown to us by Mr. C. O. Waterhouse, who also thinks they are the same species. In the course of his notes Dr. Sharp proposes the two following suggestions for its occurrence in Britain. "I incline, however, ... to the conclusion that we have here to do with two species almost identical in structure and general characters, produced independently in the two Antipodes of the world, but under very similar conditions." This appears to us extremely doubtful. Later on he writes—"It may be suggested that it was introduced many years ago and has become naturalised at Plymouth. Should this species not be found elsewhere in Europe we shall perhaps have to adopt this view." This seems a much more reasonable idea. It would be interesting to know which view Dr. Sharp really takes.

Among the species of Coleoptera recorded by Mr. Champion (*l.c.* p. 235) as having been taken by Colonel Yerbury this summer, in Scotland, we note *Pachyta sexmaculata*, Linn., caught at Nethy Bridge. This is a very interesting capture and confirms the species as British, it having rested until now on two specimens taken at Aviemore.

At the meeting of the Entomological Society of London, held October 3rd, 1900, Mr. M. Jacoby exhibited an ichneumon, *Rhyssa persuasoria*, taken by him at Blandford, parasitic on *Sirex*, and Colonel Yerbury said that he had met with the same species in some numbers in Scotland. One female observed in the act of oviposition had thrust her ovipositor, which is of about the consistency of a human hair, through an inch of fir trunk.

At the same meeting Colonel Yerbury exhibited:—(1) A rare saw-fly, *Xyphidria camelus*, taken in Scotland this year at Nethy Bridge. The species is mentioned in the old books as extinct in the United Kingdom, and Mr. Waterhouse said there were no modern specimens in the South Kensington Museum collection. (2) Rare diptera from Scotland including (*a*) *Laphria flava*, two males from Nethy Bridge; (*b*) *Chamaesyrphus scaevoides*, new to the fauna of Great Britain, from the Mound, Sutherland, where it was common on *Umbelliferae* under fir-trees in a damp wood, one female also being taken on the path up Cairngorm, near Glenmore Lodge; (*c*) *Microdon devius*: (*d*) *Chilosia chrysocoma*, at mountain-ash blossom, Nethy Bridge; and (*e*) *Stomphastica flava*, two males from Golspie, September, 1900.

At the same meeting The Rev. D. Morice exhibited a remarkable hermaphrodite of the bee, *Podalirius* (=*Anthophora*) *retusus*, in which the male characters were confined to the left side of the head and genitalia, the right side of the thorax and the abdominal segments. The antennæ and hind (pollinigerous) legs were those of a female, and the genitalia half of each sex.

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Over Three Passes—the Splugen, the Stelvio, and the Brenner—with some notes on the Butterflies by the way.

By H. ROWLAND BROWN, M.A., F.E.S.

After an exceptionally wet June, the prospect of a little tour abroad in search of butterflies was more than usually pleasant this year, but it is a fact that when I left England on July 3rd for Bâle, I also left the best of the weather behind me, and rarely did I come across any heat which might be called abnormal during the ensuing five weeks. True, we had some baking days on the approaches to the Stelvio, and the nine hours' diligence ride from Sondrio to Bormio—a distance of 41 miles—for the most part, along a sweltering plain, will live long in my memory for the leisurely discomfort of the overloaded coach and the myriad flies. My wanderings led me, however, into many pleasant spots over the Splugen, the Stelvio, and the Brenner, and at Trafoi and Brenner I found hunting-grounds full of possibilities which I had unfortunately too little time to develop. July 4th found me at Thusis, and the next day I unfurled my net and started on foot for the village of Splugen, an enjoyable walk through the Via Mala and much picturesque scenery. The first insects to greet me in the morning were early Erebias—*ligea*, *eurýale*, and *stygne*—all in grand condition, while in the town itself *Papilio machaon* was making a brave show by the most unsavoury of the many puddles left by yesterday's rain. My subsequent experience of this splendid insect confirms the observations of Wocke recorded in Frey's *Lepidopteren der Schweiz*, for I found it flying in the Chiesa valley on the one side, and high on the Stelvio, a good 500ft. or more above Franzenshöhe, the Austrian customs' house, 7,180ft. above the sea level. Individually, I could detect but little difference between the Alpine examples and the fenland form from Cambridgeshire. Perhaps the colouring was a little paler, but certainly in size my mountain specimens exceeded the largest British-caught in my cabinet. Once out of the Via Mala the country opens out, with little bits of marshy ground and green meadows beside the road to tempt frequent deviations and excursions from the beaten track, and an ever beautiful retrospect of pine-clad hills and misty distance. Looking over my diary it would seem as though each separate day on the march produced one insect conspicuously more abundant than the rest. Here it was *Plebeius argus*, spangling the road wherever there was a little moisture collected, or flitting restlessly over the reedy hollows; on the other side of the pass

it was *Parnassius apollo*, apparently wanting on the Swiss slope, though when I left the village next morning the road to the summit was wrapped in a thick fog, which only cleared when the summit was attained and the frontier crossed. The northern face, moreover, was the only locality in which I found Lycænids really abundant, and this a matter of specimens rather than species. The first week of July is perhaps a little early for Alpine "blues," but *Lycaena arion* was everywhere to be seen, mostly of the dark aberration approaching the var. *christi* of the Simplon. *Polyommatus hylas*, *Nomiades cyllarus*, and *Polyommatus icarus*, with *Chrysophanus* var. *eurybia*, fine and fresh, completed the list, while of the fritillaries, *Melitaea dictynna*, *Argynnis adippe*, and *A. lathonia* were fairly abundant, and on every rock where a sun bath was to be enjoyed *Pararge maera* had taken up its position. Unfortunately, the next day the sky became overcast in the morning, and though I had six hours to wait at Chiavenna for the train to Sondrio, I could do little collecting. Judging, however, from a brief climb among the chestnut woods, cut short by a shower of what seemed to be hot water, I should say that this, the junction of the roads from the Engadine and the Oberalp route, was a first-rate place for the entomologist. *Polyommatus orion*, newly emerged, was in force on the sedums along the low stone walls, a brilliant *Melitaea didyma*, with *Leucophasia* var. *diniensis*, fluttered on the outskirts of the forest, and on every bramble-blossom *Syntomis phegea* contested for the superiority with one or other of the Anthrocerids. My object in traversing the Splugen was to reach Chiesa—a small Italian village situated in the Val Malenco about ten miles north of Sondrio. I had no idea of what this valley might produce, but the description in Baedeker read temptingly, and so I directed my steps thither on the 7th. From every other point of view than that of the bug-hunter the expedition was a success, but, for some reason or other, the Val Malenco was at this time of the year singularly destitute of even the common species. At Sondrio, *P. podalirius* was to be seen in the streets, and again *P. orion* was common enough, but no sooner did I begin to ascend than the butterflies became scarcer and scarcer with the notable exception of *Melitaea athalia*, certainly *the* insect of this walk. The three days' spent at the very comfortable Albergo Olivo, in Chiesa, were rather against collecting, but a walk to the Palü Lake (6,320′), passing the asbestos mines, should have yielded a fair bag, though I only saw *Coenonympha satyrion*, *Chrysophanus* var. *eurybia*, *Nomiades semiargus*, and a few worn *Erebia ceto*, while near the village a specimen or two of *Eugonia polychloros* was in evidence. My first week, in fact, showed a very poor return for a good deal of hard collecting, and finding Chiesa barren of results I packed my boxes and headed for the Stelvio. There is an appetising catalogue of species occurring on this, the highest carriage pass in Europe; you may read of them in Dr. Frey's Swiss hand-book, which includes this corner of Italy and part of the Austrian Tyrol as well. Suffice it to say, that I came across pretty well all the butterflies recorded therein, and a few beside. Bormio, or, rather, the Nuovi Bagni di Bormio where I put up, is surrounded by somewhat sterile hills, gradually merging into the highly-cultivated Valtellina. I had not realised that I had struck one of the best localities for *Erebia nerine* var. *reichlini* until just above the hotel I found the road and the hot limestone slopes teeming with this splendid butterfly, the

sight of which was an ample compensation for many blank days, and an earnest of *Erebiidi* to come without end. Other species, all in profusion and of quite exceptional size, were *Thecla spini* and *Chrysophanus gordius*, while *Melanargia galathea*, black as *procida*, and *Melitaea athalia*, with *Syrichthus alveus* var. *serratulae*, and *S. carthami* literally swarmed. I had to start early to avoid the fierce sun on the zigzags of the upper road, and it was not until I was nearly at the top of the pass that the morning was sufficiently advanced for collecting. Curiously enough, the Italian side hardly produced a single specimen, but once over, or, rather, on the summit, and the game began to show. That walk from the top of the Stelvio (9,055ft.) to Franzenshöhe and on to Trafoi I shall not soon forget. There was my old friend *Erebia glacialis* swooping over those innocent-looking shoots of loose stones, and, on the built-up masonry by the wayside, *Erebia gorge* var. *triopes*. Every golden hawkweed carried its *Pieris callidice*, unblemished and untorn, while an occasional *Erebia mnestra* (evidently only just coming out) turned up on the higher windings of the road. I find the words "Trafoi—great!" in my notes; and great it was, a feast for the eye with its giant snow peaks and silver glaciers, its rushing streams and scented pine woods. My only regret was that I could not stay longer than the allotted five days, for I found among other inducements the new Post Hotel, where a sympathetic landlord gave me the run of his meat cellar for a dark room, and took a friendly interest in my pill-boxes. Now, I have often taken *Erebia glacialis* in a mild sort of way on the higher mountains of Switzerland, chasing battered specimens and working up long miles of moraine in the pursuit, but by accident I came across my quarry, not "in single spies, but in battalions," beneath the shadow of the mighty Ortler. A pleasant path winds up from the river opposite the hotel through the forest, where for the first time in my life (a red-letter day for the collector) I chanced upon two *Brenthis thore* in the pink of condition, among a number of *B. selene* equally fresh on the wing. Once out of the woods there was not much to be netted save an occasional *Syrichthus*, which I still hope may be *andromedae*, and I was actually going to turn back when I noticed a hut on the track to the Ortler lower down than the Payerhütte, where climbers spend the night before the greater ascent. Half an hour of unproductive plodding brought me to a wide, stony valley with only the scantiest vegetation, and there flying over the stones I beheld my *E. glacialis* everywhere. I have just measured the largest—a female—she is close upon two inches from wing to wing, and the rest are in proportion. All specimens taken on this side of the valley appear to be of the ab. *alecto*, but though Kane gives Stelvio for ab. *pluto*, it did not appear to occur on this particular ground. The only other *Erebia* hereabouts was *E.* var. *triopes*, but judge of my surprise when a full-blown *Gonepteryx rhamni* flashed out in this desert. "Solitary specimens," says Frey, "at considerable elevation . . . . the Daubensee on the Gemmi (6,791ft.)," but this must have been over 8,000ft., and it appeared then to be flying downwards. *Pieris callidice* also turned up in some quantity, with an occasional *Colias phicomone*, and on the way back *P.* var. *bryoniae*. Among other unexpected high-flyers I may also mention *Callophrys rubi*, on the Stelvio Road, at 7,000ft., and a remarkably small race of *Pararge maera* even higher, within a few

minutes' walk of the head of the pass. Frey mentions about 65 species as occurring on the Stelvio, and I need not recapitulate them, as, with the exception of *Polyommatus amanda*, *Erebia oeme* and *E.* var. *hippomedusa*, I think I came across all of them, as well as *A. thore*, *A. amathusia* and *Polyommatus pheretes*, which are not included. With regard to the latter, I may add that both here, at Cortina, and on the Brenner, it was the commonest Lycænid, and that the females, usually accounted scarce, were in almost as great profusion as the males. *P. eumedon*, a large type, and *P. donzelii* were also well represented.

(*To be concluded.*)

Some Diary Notes on the Season's Collecting.

By W. J. KAYE, F.E.S.

(*Concluded from p.* 235).

Following the Leicester excursion, the lights were again put into use at Worcester Park, and on June 19th, *Hadena genistae*, and a single *Neuria reticulata* (the latter seen for the first time in the neighbourhood) were the most select of the visitors. Sugar applied the same evening gave disappointing results : *Heliophila* (*Leucania*) *comma* and *Miana fasciuncula* were common and in fine condition. *M. strigilis* and *Rusina tenebrosa* (all ♀ s) were worn, and these practically were the only insects attracted. June 20th-22nd was given to a flying visit to Lyndhurst. Owing to incessant rain, collecting was impossible. The only things noted being a couple of full-fed larvæ of *Lasiocampa quercûs*, and a worn *Boarmia consortaria* on a pine-trunk. At Worcester Park, on the 24th, *Habrostola triplasia* was taken, and on the 27th, at sugar, *Tapinostola arcuosa*, *Noctua festiva*, *Heliophila impura* and *H. comma* were again the best that the "sweets" produced. *Cidaria associata* turned up at light after having been absent, or apparently so, from this locality for a very long time. On the 29th lodgings were secured at Bude. On the very limited sand-hills on the same evening, *Mamestra albicolon* came to sugar. Weather again interfered with collecting, and Saturday, 30th, was a complete blank. Next evening a small patch of marshland was tried, and *Hadena dentina*, *H. oleracea*, and *Apamea gemina* turned up in numbers, but of the better class there was no representative. *Choerocampa elpenor* was netted at a blossom of yellow flag in the same spot as one was similarly taken the previous year. On the evening of July 2nd the marram grass was sugared on the sandhills for *Heliophila littoralis*. Two specimens were taken by this means, but the acetylene lamp used was much more attractive. Six more *H. littoralis* and three *Agrotis ripae* were taken as they flew up. Two pairs of *Mamestra albicolon* were found *in cop.* on the marram grass. These produced fertile ova, but something went wrong with the full-fed larvæ, only six going into pupa. The morning of the 3rd gave promise of being fine, and a pilgrimage was made to the haunt of *Lycaena arion*. Three specimens were secured and then the sun was obscured, and for the rest of the day remained so, and the bag remained at three. On the sand-hills the same insects as before were taken. On the 5th *Agrotis vestigialis* appeared. Day work when possible was given up to going after *L. arion*. On July 6th *Leucophasia sinapis* was taken in a lane in fine

condition. This shows how late a season we had, for the two *L. sinapis* taken were too early to belong to a second brood, and must have belonged to the first brood of the season, even in this western locality. *L. arion* was, let us hope, not fully out, for eleven specimens in a week's hard work does not promise well for the continuance of the race! At Worcester Park, on July 8th, *Agrotis corticea* came to light. On the following day *Trochilium tipuliformis* was seen on the currant bushes in the garden. On July 7th *Drepana falcataria* emerged, the imagines forming a second brood bred in captivity, from eggs laid on May 3rd. At Oxshott, on the 12th and 13th, ♂ s of *Plebeius aegon* were plentiful but no ♀ s. *Larentia viridaria* was still about and *Endotricha flammealis* and a belated ♀ of *Bupalus piniarius* were about the only other lepidoptera moving. On the 15th at the same place *P. aegon* was fully out, both ♂ s and ♀ s being readily obtained. At home a ♀ *Zeuzera pyrina* was found at rest, and at dusk *Dilina tiliae* was seen hovering at honeysuckle. On the 16th some nice insects came to light, two of which reported themselves for the first time in this district—*Spilodes palealis* (one) and *Geometra vernaria* (one) being very unexpected in this heavy clay locality. The chalk formation is some three miles distant. Besides these two species, *Dipterygia scabriuscula*, *Agrotis strigula* and *Pyralis glaucinalis* were the best. The following evening *Axylia putris* put in an appearance. Although not generally described as such in text books, I think this species must be local. Several entomologists say they have had the same difficulty in procuring a series as myself. On July 20th sugar was applied for *Calymnia diffinis*, which used to occur plentifully in the neighbourhood but not a sign of one was seen, in fact sugar here has been a total failure this year. *Habrosyne derasa* (one) was the only insect save for one or two worn *Agrotis exclamationis*. "Light" again came to the rescue. *Heliophila conigera* (common), *Malacosoma neustria*, *Pyralis costalis* (abundantly), *Acidalia interjectaria*, and another fine specimen of *Spilodes palealis* are the insects noted as taken. On the 22nd, at light, single specimens of the following came in besides some commoner things—*Ptilodonta camelina*, *Miana literosa*, *Tethea subtusa*, *Scotosia rhamnata* and *Cnaemidophorus rhododactylus*. Last year a worn specimen of the last species was taken, but its condition made determination at the time uncertain. On the 25th, *Axylia putris*, *Agrotis tritici*, *Jaspidia perla* and *Pyralis glaucinalis*, the last commonly, were attracted by the illumination. On the 25th, at Effingham, *Eurymus* (*Colias*) *hyale* and *E. croceus* (*edusa*) were seen. The 26th showed a specimen of *Cyaniris argiolus* at Isleworth, thus pointing out that the second brood was well up to time. For the month of August there is very little to be recorded, collecting coming in for second place. A week spent at Tenby was attended with great storms of wind and rain, and what with a temperature not reaching 60°, if entomology had first thoughts very little could have been done. Saturday was the only day on which the sun remained out. On this day, near Pembroke, in a particular lane the number of *Maniola tithonus* and *M. janira* observed was quite phenomenal. The former species predominated in point of numbers, but both species absolutely swarmed. It struck me at the time that the cause might have been brought about by all the fields of mowing grass, clover, lucerne, &c., having been cut and that the lepidoptera had all congregated to this lane, where there was still an

abundance of flowering plants. On August 17th and 21st *Cyaniris argiolus* was seen at Worcester Park. On the 29th half a dozen *Acidalia dimidiata* hatched from pupæ, the eggs of which were found on July 25th on lettuce. A run was made over to Wicken again on August 30th for two days. At this late period of the year there is necessarily not much to be done, but those who want *Hyboma strigosa* will, if their patience lasts, beat out, perhaps, one larva from hawthorn after six hour's work. Bailey had taken something like half a dozen, but I was unrewarded. Wicken is probably the limit of its range as one is there off the chalk, to which formation the species is attached. A few larvæ of *Hecatera chrysozona* were still about on the lettuce seeds, and *Manduca atropos* was being found fairly commonly in potato fields. Something like three dozen larvæ and pupæ had already been secured by different individuals. It is quite probable that this species breeds in and around Wicken yearly, as besides potato there is a large quantity of *Lycium barbareum* grown in the cottage gardens, and should a few larvæ feed up and pupate at the roots of this, the large conspicuous chrysalis would escape the inevitable detection to which it is exposed when ensconsed at the roots of potato. Upon my return home a large number of *Acidalia dimidiata* had emerged, in fact all the pupa-cases were empty, which goes to show that the second brood was not a partial, but a complete one.

On the generic name Micropterix (Micropteryx), Hub.

By J. W. TUTT, F.E.S.

Although the proper use of the name *Micropteryx* was fully cleared up in *The Natural History of the British Lepidoptera*, vol. i., pp. 129-130, it is still so generally misapplied by some lepidopterists that a brief summary of the principal facts may be advisable. Hübner, in the *Verzeichniss*, p. 426 (1826), founded the genus *Micropterix* for the three species *mucidella*, Hb., *poderinella*, Hb. (=*aruncella*, Scop.), and *pusilella*, Hb. (=*calthella*, Linn.). The first species is an Elachistid, and leaves *aruncella* and *calthella* as representatives of *Micropterix*, Hb.

In 1839, Curtis separated the British Micropterygid and Eriocraniid species from *Lampronia* under the name of *Eriocephala*, and cited "*calthella*" as the type. This made *Eriocephala* synonymous with *Micropterix*, Hb., for Stephens in 1835 had constituted *calthella* the type of *Micropteryx*. Stainton, however, maintained (*Trans. Ent. Soc. Lond.*, 1850, pp. 20 *et seq.*) the name *Eriocephala* for the "*calthella*" group, but, in 1851, Zeller (*Linn. Ent.*, v., pp. 322-3) reverted to the original use of the name *Micropteryx* and kept it for the "*calthella*" group, creating *Eriocrania* for the "*purpurella*" group. This division was maintained by Snellen (*De Vlind. van Nederland*, pp. 1065 *et seq.*) in 1882.

Kirby properly sinks (*Lloyd's Nat. Hist. Lep.*, v., p. 315) *Eriocephala*, Curt., as a synonym of *Micropterix*, but states that the type of the latter genus is *aureatella*, a species not included in Hübner's genus. This is undoubtedly incorrect as *calthella* had been fixed as the type by Stephens. It is quite evident that Meyrick's use of the name *Eriocephala* for the *calthella* group, and *Micropteryx* for the *purpurella* group, is equally erroneous. Chapman, in his important papers on this group in the *Trans. Ent. Soc. London*, 1893 *et seq.*, commenced by

calling the *calthella* group *Micropteryx*, but afterwards changed it to *Eriocephala*. The general erroneous use of these terms has since been in the direction here indicated. Lord Walsingham and others, however, have in their recent work made the necessary correction.

The facts, so far as we have discussed them in *The Natural History of the British Lepidoptera*, vol. ii., give the following conclusions:

Superfamily	..	MICROPTERYGIDES.
Family	..	MICROPTERYGIDAE.
Genus	..	*Micropterix* (*Micropteryx*), Hb., "Verz. bek. Schm.," 426 (1826) [Type: *M. calthella*].
Species	..	*calthella*, L., *seppella*, Fab. (included by Hübner).

The British species of the genus are—*calthella*, L., *seppella*, Fab., *auruncella*, Scop., *mansuetella*, Scop., *thunbergella*, Fab., *aureatella*, Scop.

Superfamily	..	ERIOCRANIIDES.
Family	..	ERIOCRANIIDAE.
Genus	..	*Eriocrania*, Zell., "Linn. Ent.," v., 322-3 (1851) [Type: *E. purpurella*].
Species	..	*Sparrmanella*, Bosc., *fastuosella*, Zell., *subpurpurella*, Haw., *chrysolepidella*, Zeller, *semipurpurella*, St., *purpurella*, Haw.

The British species of the genus are—*purpurella*, Haw., *semipurpurella*, St., *unimaculella*, Zett., *sparrmanella*, Bosc, *subpurpurella*, Haw., *fastuosella*, Zell., *sangii*, Wood, *fimbriata*, Walsm., &c. Snellen, in the *Vlind. Ned. Micr.*, 1063-4, 1067 (1882) omits *chrysolepidella*, which, Durrant says, thus ceases to be an available type.

The generic synonymy, therefore, works out as follows:

1. *Micropteryx*, Hb., "Verz. bek. Schmett.," 426 (1826); Stephs., "Ill. Br. Ent. Haust.," iv., (361) 423 (1835); Kirby, "Lloyd's Nat. Hist.," *Lep.*, v., p. 315. *Eriocephala*, Curt., "Br. Ent.," expl. pl. 751 (1839).
2. *Eriocrania*, Zell., "Linn. Ent.," v., 322-3 (1851). *Micropteryx* (*Eriocrania*), Snellen, "Vlind. Ned. Micr.," 1063-4, 1067 (1882). *Micropteryx*, Hein., Meyr., &c.

The immense strides that have recently been made in general entomological knowledge by the great majority of our lepidopterists, who would have been contemptuously styled "collectors" a few years ago, by the old school of systematists, leave me with less compunction in discussing this matter in a short article. We all understand now that the nomenclature relating to genera must of necessity be in a state of flux as knowledge advances, and that, however inconvenient changes may be, a fixity of generic nomenclature would of necessity represent a condition of stagnation in our onward march, a condition that we should all certainly most seriously deplore.

Hypolimnas misippus captured at sea.

By Professor EDWARD B. POULTON, M.A., F.R.S., F.Z.S., &c.

Referring to the notes on this species in vol. xi., p. 322, and vol. xii., p. 80, of *The Entomologist's Record*, I am now, owing to the kindness of Captain E. P. Ellis, able to supply a full account of the circumstances under which he made the interesting capture of three females (two of the variety *inaria*) and two males, over 500 miles from land. The notes sent me by Captain Ellis were made by him on the sailing ship *Winefred* on a voyage from Australia, and are as follows:—

"May 5th, 1893. In 00° 36′ N. lat. and 26° 42′ W. long., a swarm of butterflies about the ship; they appear to be all of one kind."

"May 9th, 1893. In 3° 56′ N. lat. and 27° 20′ W. long. Butterflies all over the ship; the sailors knocking them down with their caps from one end of the ship to the other."

Captain Ellis also informs me that during these days the ship had passed through the region of the doldrums with calms and rain squalls between the N.E. and S.E. trade winds. To the best of Captain Ellis's recollection and opinion all the butterflies belonged to one swarm and were of the same kind on both occasions. The ship was then nearly on the line between Cape St. Roque and Sierra Leone, and 580 miles from the former, 960 miles from the latter. Although the African coast was far more distant than the South American, I cannot doubt that the insects came from the former. Indeed, I put down tropical West Africa as first among the suggestions thrown out in my note (vol. xii., p. 80). The only other possibility is tropical South America, a country in which *H. misippus* has comparatively recently established itself and is spreading rapidly. The insufficient observations that have been made in South America do not justify the belief that the *inaria* form of the female is present in large proportion, while two out of the three females captured at sea belonged to this variety—a proportion entirely consistent with our much more extensive series of observations upon this species in West Africa. Furthermore, the species is not sufficiently abundant in South America to render it probable that these vast swarms can have come from there. The observation throws much light upon the comparatively recent intrusion of the species into South America, and its even later spread to the Canary Islands, and goes far to explain its extraordinarily wide distribution in the Old World.

I am making a special study of this most interesting species, and should greatly value the help of any of your readers on two points. (1) Any information which may lead to the establishment of the inclusive dates between which the late Thomas Belt was at the Montes Aureos, Brazil. (A specimen in the British Museum from the Godman-Salvin collection was collected there by Belt, and is, as far as I am aware, the earliest recorded example from the New World.) (2) The capture of large series of the species, especially of females, in any of its American localities. These are British Guiana and Brazil in South America, and the Island of Trinidad, Southern Florida in North America, and many West Indian Islands. The specimens are best sent in "papers," with exact dates and localities written upon each. The African form of the female is said to be slightly darker than the Oriental, corresponding with the darker richer colouring of its model, *Limnas chrysippus*, and, however this may be, the proportion of the *inaria* form of female differs greatly in different parts of the geographical range. A sufficient series of New World females, carefully examined and compared, may be expected to throw light upon the direction of recent lines of migration.

The specimens brought by Captain Ellis are in the Hope Department, where they can be seen at any time.—Oxford University Museum. *November*, 1900.

Tortrix pronubana in Guernsey.

By Rev. FRANK E. LOWE, M.A., F.E.S.

In 1898 I was able to record the appearance in Guernsey of *Tortrix pronubana*, which had hitherto, I think, been known only as a

continental species. Since then I have made further acquaintance with this bright little moth, and as several entomologists have asked questions by letter, I think you may like to have the scanty information at my disposal. *T. pronubana* makes its appearance at the extreme end of August*, and continues up to the end of the first week of October — weather permitting. To any but collectors of the Tortricids it might escape attention, I should think by being mistaken for a small *Tortrix pyrastrana*, but though very variable, it is roughly distinguishable from that species by its black band, especially decided in the male, the under wings being very like those of *Triphaena pronuba* in miniature. The yellow underwings are also of a much more coppery and fiery orange, but the two sexes are very dissimilar, as in *T. pyrastrana*. So far as I know, too, the latter is over before *T. pronubana* comes on. Another curious difference is that while *T. pyrastrana* comes freely to sugar in my garden, *T. pronubana*, though abundant within two yards of several sugaring places, has never been seen by me at the sweets, though I have found it at rest by the aid of a lantern on the *Euonymus* hedge close by. This appears to be its food-plant, for I bred a ♀ from a pupa found in a twisted shoot thereof on September 29th, and many empty pupa-cases were observed. The imago also is usually observed hovering over or resting thereon, and last year I found eggs by the side of a female which had evidently just laid them on the leaf of this plant. The eggs make a bright triangular shaped splash of vivid green, almost exactly the colour of the brighter tints of this evergreen. The customary time of flight of the imagines is from 8 a.m. to 10 a.m., in the bright sunshine. It appears most probable that it only wants looking for at these hours on the sunny side of some of the *Euonymus* hedges, now so common in the south of England, to be found to be a truly British subject. On September 20th and 21st last, between 8 a.m. and 9 a.m., I observed the males flying in dozens round the hedge, and soon discovered several females, some already paired. I have never netted a female, but always found them by searching on the upper side of the slightly curved fully developed leaves of the *Euonymus*, but out of the direct glare of the sun. I fancy it flies very seldom, neither have I observed the species to fly at dusk when I am putting on the sugar as I often see others of this family. In conclusion let me say that I hope these remarks will be regarded leniently as the opinions of an amateur, as I have made no study of Tortricids, and profess no knowledge of their habits.

The species is no. 731 in Staudinger and Wocke's *Catalog* (1871), p. 238, and is there placed in group *H* (*Heterognomon*, Led.) of *Tortrix*, L., between *T. viridana* and *T. insolatana*, and "Eur. meridionalis" only is given for its distribution. *Tortrix pyrastrana* (or rather *podana*, Scop.), with which it is here compared, is placed in this *Catalog*, p. 235, in group *A* (*Cocoecia*, Hb.), between *T. piceana* and *T. testaceana*.

* Occurs in April on the Riviera where we have taken it not uncommonly.—Ed.

The egg of Cossus orc, Streck., with some notes on the egg of C. ligniperda.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Some ova of *Cossus orc*, Str., were received from Mr. Tutt. They

were obtained from a female found at Tilbury Dock (*antea*, p. 393). These eggs are of large size and very similar in general appearance and texture to those of *Cossus ligniperda*. They are especially alike in having their sculpture marked out by the addition of a dark material, probably a cement to retain the eggs in the crevices in which they are naturally laid. In these eggs the sculpturing is so bold that the pigment filling the hollows marks out the pattern more conspicuously. In those of *C. ligniperda* the sculpture is less bold, and is apt to be obscured by the pigment, yet the general effect is much the same. The difference between the two eggs is also great; that of *C. ligniperda* has all the appearance of an upright egg, with a somewhat flattened base, and its sculpture is ribbing of a character not absolutely different from that of a Noctuid. The egg before us has only one character of an upright egg, *viz.*, its tranverse section, *i.e.*, the section at right angles to the micropylar axis is everywhere circular. It has no flattened base, but in form both ends are tolerably alike. The longitudinal section through the micropyle would be an ellipse were it not slightly sharpened towards the ends, and perhaps rather fuller towards the micropylar side of the equator.

The egg is no less than from 2·3mm. to 2·5mm. in length, and from 1·7mm. to 1·8mm. in diameter, varying a little in size in different specimens. The sculpturing is a network of very bold, broad raised lines or ridges, which are fully a fourth in width of the spaces between, and apparently equally high. The pattern is very irregular, and is as often of squares as of good hexagons, but the line of ridge often goes straight past six or eight cells, and in so far presents a step towards the passage from network to ribbing. The cells of the network are much larger towards the micropylar end, and the change takes place rather rapidly a little above the equator. They are even smaller towards the nadir, over which they are continuous. The diameter of a cell some way above the equator is about ·12mm., and at an equal distance below ·07mm. The micropylar rosette is a circle of narrow radiating small cells ·2mm. in diameter, and followed immediately by the general coarse netting.

The question as to whether the great differences between this egg and that of *C. ligniperda* imply want of near relationship is interesting and difficult. No doubt it does imply want of *near* relationship, but probably less than the same difference would in more evolved families. We do not refuse to the Acidalias a position with the Geometrids, because they have eggs that in some cases are really upright, recognising that there is a constant tendency for flat eggs to specialise into upright ones. Such a tendency would act more readily no doubt lower in the series, so that we must probably conclude that the Cossids have flat eggs, tending to develop into upright ones, which is largely expressed in *C. ligniperda* and possibly leads on to the egg of *Castnia*, which is upright in form.

Lepidoptera in the Hautes-Alpes: Abries.

By J. H. and J. W. TUTT, F.E.S.

(*Concluded from p. 262.*)

Another delightful trip, and probably the most successful entomologically, was that to the Crête de Reychasse. For this one starts by going

towards the village, crossing the bridge, going at once along the left bank of the river coming down from the valley to the left, past the church, and following the mulepath that leads up to a cottage high above the valley, and which one sees from the hotel. To do this one must start in the early morning, not later than 6.0 a.m. or 6.30 a.m., and must not loiter by the road, at least not in the first part of the journey. The steep slopes one passes almost at the commencement of the journey are well worth a day's exploration, but we could not find the time. We observed here large numbers of *Parnassius apollo*, *Satyrus actaea*, *Melitaea didyma*, very dubious *Anthrocera lonicerae*, and many other species. In the early morning, too, the smaller fry was in considerable numbers, and a species of *Coleophora* was in amazing abundance flying about the *Gnaphalium*. The ordinary common alpine plumes, too, were in considerable plenty—*Mimaeseoptilus coprodactylus*, *Aciptilia tetradactyla*, &c.—and many common Geometrids. The object, however, was to get ahead as quickly as possible, and hurrying rapidly up through the fields, the cottage was passed, and we soon struck the larch wood by keeping to the path, and disturbed almost immediately vast numbers of *Cleogene lutearia*, *Acidalia flaveolaria*, *Larentia verberata*, *Cidaria populata*, &c. whilst from the larches, millions of *Paedisca occultana* were dislodged as one brushed the lower branches or for a short distance forced one's way through them. One suspects that a steep climb anywhere to the left would bring one quickly to good collecting ground, but we could hear the cowbells just above us, and we surmised that the slopes might be grazed too closely to afford many insects. So we went on through the wood and soon struck the water that is carried along the side of the mountain in order to irrigate the meadows through which we had just ascended. Wherever the morning sun broke through the trees, a small open space would give an abundance of wild flowers, and here *Erebia euryale*, *Plebeius argus*, *Argynnis aglaia*, &c., were in great numbers, and *Chrysophanus virgaureae*, *Nomiades semiargus*, &c., in less abundance. Two or three paths cross the stream but we forged right on until we were in the adjoining valley, when other villages came into sight below and were left behind. Presently the swift stream that has worn this huge valley sent its hum to us, and later we see it as it breaks through the rocks, in its turbulent rush, after leaving the less rapidly descending slopes at the foot of the Crête de Reychasse and the Col Bouchet. Then we had to climb the slopes to the right to skirt the fall and cross the stream higher up, yet still some considerable distance below the Col. One cannot help noticing here that the larches have been practically defoliated by the larvæ of *Paedisca occultana*. Facing one as the stream is crossed is the Crête, and the slopes of this mountain to its summit swarm with alpine insect life. In the bed of the stream and high up the slopes *Parnassius apollo*, very like and at first mistaken for *P. delius*, flies in the greatest abundance, and *Brenthis pales* is everywhere, *Argynnis lathonia* occasionally, *A. niobe* and *A. aglaia* in great abundance still, as also *Erebia tyndarus*. *E. euryale* has almost entirely been left behind, and *Melampias epiphron* soon appears, with *Colias phicomone* in great abundance, and a few *C. palaeno*, strangely enough worn, whilst *C. phicomone* is, in the greater number of cases, in excellent condition. *Pieris callidice* flies swiftly by, but the slopes are much too steep to hope to capture it. *Melitaea didyma* still occurs, although one must

have reached almost 7000 feet, and two or three *Chrysophanus alciphron* are netted in poor condition. *Polyommatus damon* is still abundant, but *P. orbitulus* becomes our particular quarry, both sexes being repeatedly netted, whilst unexpectedly a few very ordinary *P. icarus* are captured. There is no diminution in the large numbers of insects as we climb the next two or three hundred feet, and *Syrichthus alveus*, *Thymelicus lineola*, and *Pamphila comma* repeatedly buzz at the flowers and tempt capture. *Melitaea parthenie* soon becomes frequent, and at last *Posodes trepidaria* and *Hercyna phrygialis* suggest that a falling off may be expected, and so it happens. As we leave the hot sunny slope up which we have climbed, and turn along the topmost ridge, although several of the species cross our path they are not in such great numbers as hitherto, and we work slowly along, picking here and there such specimens as we want, but climbing rapidly all the time. Then as one faces the last steep grassy slope, a black *Erebia glacialis* starts in front, but the species is apparently almost over here and, at last, a long sloping ridge leads quite to the summit of the mountain, and whilst on the one side of the ridge are the steep rough skrees where *Erebia gorge* abounds, on the other is a slightly sloping mountain pasture, on which *Colias phicomone*, very small and in very fresh condition, is the prominent feature, unless, indeed, the brilliant carpet of yellow *Hieracia* is not much more attractive to the all-round naturalist. Once on the summit, in spite of the sun, the air is quite keen, but the outlook is charming. A peep away over the Col Bouchet among the great mass of alpine peaks that stretch away beyond the Italian frontier, now buried in cloud, and then standing up clear-cut against the blue sky, comprises a scene of beauty long to be remembered, the massive rocks reminding one somewhat of the choicer parts of the Tyrolean Dolomites—

> Rocks—that rise in silent grandeur
> Far into the azure sky,
> Or that pierce the snowy circlet
> Where the fleecy clouds do lie.

Larvæ of Deilephila euphorbiae.

By FREDERIC MERRIFIELD, F.E.S.

The larvæ of *Deilephila euphorbiae* are extremely abundant in the Vals-Platz, the valley of the Lugnetz, an affluent of the Vorder-Rhein in the Grisons, where I spent the last two or three weeks of August. Varying greatly in colour, and to a less degree in markings, they tend to gather into three groups, the most common one, in which the predominating colour is reddish, very much the colour of red vulcanised indiarubber, another form, in which yellowish-green prevails, and a third form in which the ground colour is mainly blackish. The conspicuous feature in which all three agree is the subdorsal row of large light-coloured spots, varying from white to yellow, usually cream-coloured; all the other markings, except perhaps the reddish colour of the dorsal line and head, &c., in most of them, go for nothing on a casual glance. They lie on and across their food-plant, the fine-leaved *Euphorbia cyparissias*, or sometimes on a grass bent rising out of it, and are very sluggish except occasionally when crawling from a patch of their food-plant, nearly eaten down, to another. The subdorsal situation of these spots is undoubtedly in this and other larvæ which feed exposed on ground not covered with a dense vegetation, that

which is best adapted for conspicuousness in any usual position. The larvæ so invite attention as to suggest inedibility, and an experiment I tried confirms the suggestion. The very obliging landlord of the Thermes Hotel readily agreed to shut up for a few hours eight or ten chickens that he had, varying in size from three parts to full growth, so as to make them a little hungry, and I threw among them sixteen larvæ, mostly full grown or nearly so. The fowls, which were in a confined space about eight feet by four, on bare ground, in general took no notice of them, though the caterpillars made themselves very conspicuous by crawling as well as by their colours, even when the birds trod on them as they often did. One of the fowls, however, attacked a large larva, giving it five or six pecks, but then desisted. I am almost sure it was this fowl—certainly it was one of the only two brown ones—that almost immediately afterwards visited the water-trough in which it dipped its beak many times, a thing I did not see done by any of the others. Another fowl pecked once or twice at a larva, but did not return to the charge. I tried the fowls again later, with similar general results. I may mention that I had collected many of the larvæ in the hotel grounds over which the fowls often wandered, so that the larvæ could scarcely have been unknown to them. I could not try the experiment with lizards, as these were exceedingly scarce at Vals-Platz, and I did not see more than three in all my walks there. The larvæ were in thousands, distributed over the hillside from 4000 to 5500 feet above the sea, perhaps higher. Possibly the scarcity of lizards in this valley, which is a cool and humid one, having a general inclination towards the north, may make it a successful breeding-ground for the insect. I had written thus far, when I referred to Weismann's *Studies in the Theory of Descent*, and found there that though a lizard would not eat the somewhat similar larva of *D. galii* (a species found by me in this valley in small numbers) it at once attacked and swallowed a large larva of *D. euphorbiae;* and it seems possible that the scarcity of lizards and the distastefulness of these larvæ to birds—at all events to some birds—may have a connexion with their abundance in this locality. Of wild birds there was the scarcity usually observable in Switzerland. I saw none but redbilled choughs in large numbers, but not seen by me lower than about 6000 feet, and a few other crows and hawks including one or two kestrels. One would like to know what it is that prevents *D. euphorbiae* from increasing to an overwhelming degree. Suppose a pair produces not less than 150 eggs, it must happen that, taking one year with another, 148 die before becoming parents. The larvæ seem hardy and are easily reared. I have not found them attacked by insect parasites nor by disease, nor have I heard that they are so. The perfect insect is known to fly far, and doubtless large numbers take flight into the neighbouring regions where lizards abound; possibly this may be one of the means by which their numbers are kept down. May I venture to suggest that books which aim at giving a complete description of insects, by describing their lives and habits as well as their structure, should, at least in dealing with the dominating types, endeavour to give not merely what they feed on, but what feeds on them and to what extent—their effective enemies, as well as their commissariat—facts of cardinal importance in judging of the causes which lead to their prevalence or to their disappearance? Without full information as to the destructive as well as the productive forces,

we have only half the materials for tracing the means by which the struggle for existence of any species is carried on, the conditions of the long warfare, and the circumstances which decide the ultimate issues.

Lepidoptera at Burgess Hill, Sussex.

By J. C. DOLLMAN.

The following list, though it may not contain any very specially rare species, may possibly be of interest as a record of a locality not much known. The insects mentioned were seen or taken between July 26th and September 10th. In a clover field between Burgess Hill and Hassocks Gate, on the London Road, a female *Papilio machaon* was netted on August 11th. It was a large insect, but much worn and broken. There is a large sheet of water with a reedy bank and a mill stream in the vicinity which may be explored. *Colias edusa* and *Colias hyale* were both found on August 10th in the clover field mentioned. *C. edusa* was in fairly large numbers, and continued to be so all through August, both in clover fields and on the adjacent South Downs up to September 10th, the day of leaving the locality. A pair was taken on September 5th and ova obtained. *C. hyale* was found frequently in this and other clover fields in the neighbourhood up to the date of my leaving, and the insect was taken on the following dates: August 10th, 11th, 13th, 14th, 15th, 16th, 17th, 18th, 24th, 25th, September 3rd, 4th, 6th, 7th—24 in all. This butterfly does not appear to locate itself for long in this district upon the clover fields where it is bred, but after a day or two will betake itself to the downs and there flies strongly and warily on the slopes. With reference to the capture of this insect in the open on the downs it will be found that if three or more persons be engaged it may be headed off cautiously, and on being approached from three points at once will not attempt a headlong escape, but seems to get confused and takes refuge on the ground, from which it may be taken with comparative ease. After adopting these tactics not one specimen escaped capture. While on the clover it does not seem a shy or cunning thing, and can be taken without much trouble as it flies along the edges of the field. It is altogether a different creature in the open on the downs. Neither *C. edusa* nor *C. hyale* seem to resort to a soaring flight as a means of escape, and one seldom sees either species flying at an altitude of more than five or six feet from the ground. *Gonepteryx rhamni* was well out and numerous early in August on the clover, and in fine condition. *Argynnis aglaia* was flying on Ditchling Beacon in fairly good numbers, though worn and faded, in August. *Vanessa io* was numerous in the same place, but suddenly disappeared at a day's notice, still in perfect condition, the same thing was noticed with *Pyrameis cardui*, though the insect had not been plentiful like the preceding one. *P. atalanta* was present sparingly, and *Pararge megaera* fairly numerous, and from a female of the latter species ova were obtained and larvæ bred. The larvæ thrive well on common couch-grass. *Satyrus semele* was in great strength on the downs in the neighbourhood of Ditchling Beacon, and in all conditions, from the newly-emerged insect to the worn-out example, in the middle of August. *Epinephele tithonus*, swarming on every roadside, was out for some time, and frequently on the

road between Burgess Hill and Hassocks Gate. *Zephyrus betulae* was to be seen flitting over the growth and trees by the plantations at the roadside. *Z. quercûs* was observed occasionally, and also *Chrysophanus phlaeas*, though the latter insect was not abundant. Of the Lycænids *Polyommatus astrarche*, *P. icarus*, *P. bellargus*, *P. corydon*, and *Cyaniris argiolus* were all fairly common. Ova were obtained from *C. argiolus*, *P. corydon*, and *P. icarus*, and the larvæ from the last-named bred from the egg. *Thymelicus thaumas*, *Pamphila sylvanus*, and *P. comma* were found, the latter in numbers on Ditchling Beacon, and early in September this insect could be seen buzzing amongst the herbage on the downs depositing ova, and, if followed, the egg was to be obtained by searching carefully. *Macroglossa stellatarum* was seen once or twice only in the garden at Burgess Hill. *Porthesia auriflua* and *Notolophus antiqua* were to be found, and one male *Malacosoma neustria* was boxed from a sallow bush at the roadside while searching for larvæ of *Cerura vinula* and *C. furcula*. The larvæ of both of these were found, the first in abundance, in all stages. One ♂ *Cosmotriche potatoria* was taken at the window, attracted by light, at the end of July. One larva of *Ennomos erosaria* and one of *E. tiliaria* also were taken. The locality abounds in sallow growth, but not once did a larvæ of *Notodonta ziczac* fall into the beating-tray. Two *Ptilodonta palpina* larvæ were discovered, and hosts of full-fed *Phalera bucephala* from both oak and birch trees. One specimen of *Bryophila muralis* (worn) was taken at sugar, but this was probably a visitor from some other locality, as Burgess Hill does not possess the old moss-grown stone walls which one associates with the presence of this insect. This appearance of it was ten miles from the sea-board. *B. perla*, both at rest and at sugar, was abundant. One larva of *Apatela aceris* was seen crawling on a fence between Burgess Hill and Hassocks Gate. *Leucania litharyyria* came sparingly, and between August 20th and 30th two specimens of *Leucania albipuncta* were taken at sugar, the first, a female, in worn condition, the second, a male, almost fresh. *L. pallens* was common at sugar towards the end of August. *Hydroecia nictitans* and *H. micacea* were fairly common, while *Xylophasia monoglypha* was most abundant, as usual. *X. lithoxylea* was absent, and one *X. sublustris* was taken. One *Charaeas graminis* was boxed from a thistle-head on Ditchling Beacon, and one *Luperina cespitis* netted in the same place. *Cerigo matura* came to sugar. *Mamestra brassicae* was, of course, very evident, and with it *Apamea didyma*. *Miana strigilis* and *M. literosa* were fairly common, whilst *Agrotis puta* came freely to sugar, and showed some handsome dark females. *Peridroma suffusa* was not found freely, and *P. saucia* only seen once, whilst only three *Agrotis segetum* appeared. *A. nigricans* and *A. tritici*, were present, while *Noctua plecta* was most numerous and in fine condition. One or two *Noctua rubi* appeared in the middle of August. *N. c-nigrum* and two *N. baja* were common, while *N. xanthographa* took the lead of everything in numbers. The *Tryphaena* group were well to the fore. *T. fimbria* and *T. ianthina* common, especially the latter. Among the former were some of the dark forms. *T. comes* and *T. pronuba* were abundant, and one each of *T. interjecta* and *T. subsequa* were taken at sugar. *Amphipyra pyramidea* and *Naenia typica* appeared pretty freely, while *Mania maura*, though worn, was in numbers. Comparatively few *Amphipyra tragopogonis* were present.

Of the "Sallows" not many were seen as the time was early for them. *Citria fulvago* and *Mellinia circellaris*, however, put in an appearance, also one *Anchocelis lunosa*, very fresh in condition. One worn ♂ *Tethea retusa* was taken at sugar, and *Calymnia trapezina* and *C. affinis* were occasional visitors. One ♀ *Hecatera serena*, very late in August, and much worn, was seen, and *Phlogophora meticulosa* was strong in numbers. *Hadena oleracea* frequently came, and *Gonoptera libatrix* also. *Plusia gamma* was always to be seen, day and night, and *Catocala nupta*, in fine condition, was a constant visitor to sugar. Of the Geometrids the following were seen or taken: one *Urapteryx sambucaria* late in July, half a dozen *Epione apiciaria*, taken both with the net and at sugar. This insect's appearance was extended over August and into September. *Rumia luteolata*, *Selenia bilunaria*, and *Crocallis elinguaria* were present sparsely, and also *Boarmia rhomboidaria*. One ♂ *Geometra papilionaria* was taken near Hayward's Heath early in August, and *Zonosoma porata* with *Z. annulata* were freely found in certain hedgerows of stunted oak and maple. *Z. punctaria* was taken once at sugar, and on three or four occasions *Z. porata* was taken in the same way. The larvæ of *Eupisteria obliterata* were beaten from alder trees, fully fed, near Hassock's Gate in August, and *Acidalia bisetata* was found on the wing. *A. marginepunctata* was boxed once while at rest in a chalk pit on the downs. *A. imitaria*, early in August, was netted at dusk and also taken at sugar, one in each manner. *A. aversata* was now and then to be seen, and *A. emarginata* was fairly common in certain hedgerows early in August, though much worn. *Timandra amataria* came to sugar and the net sparingly at the end of August and in the beginning of September, and *Cabera pusaria* was taken in both ways also. *Aspilates citraria* was twice taken on the downs and ova obtained. *Abraxas grossulariata* was freely present everywhere, but of the ordinary type and rather small in size. One ♀ *Larentia didymata* was netted in mid-August, from which ova were procured. *Hypsipetes elutata* was twice taken, in very fresh condition, at sugar about the middle of August. *Melanippe procellata* could be found fairly common in the clematis bushes fringing the downs. *M. fluctuata* was a common visitor at sugar, and *Coremia designata* was taken several times at the same bait. *C. ferrugata* was seen but once. *Camptogramma bilineata* teemed in every hedgerow, but the clematis, though growing strongly near downs, yielded no *Phibalapteryx vitalbata*. *Cidaria russata* was seen only two or three times, while *Eubolia bipunctata* and *Anaitis plagiata* were to be had always when looked for on the slopes of the downs.

Lepidopterological notes from Orta in Piedmont and neighbourhood.

By Rev. FRANK E. LOWE, M.A., F.E.S.

The editor's request for notes of any given locality seems to constitute a direct duty to comply, even if the collector be conscious of having little of interest to relate. Such at least is my feeling in connection with a five weeks' stay at Orta Novarese during a period extending from May 12th-June 16th last. Difficulties are increased by the fact that I have not yet had time to arrange my captures and to take them out of their travelling cases—far less to put in order the rough jottings of my diary. But even an incomplete list of insects may serve

a purpose, and suggest the possibilities of a district to those who are meditating a visit. If then I may be allowed to aim at nothing higher than a hasty and very incomplete account of the butterflies which came in my way, I am glad to make an effort to relate my experiences, after arriving at Orta, late in the evening of May 11th, at the Hotel Belvédere on the summit of Sacro Monte. We had expected great things, and to find the insect fauna much more unlike our Swiss catalogue than proved to be actually the case. Though nature was still in its spring attire and the pheasant-eyed narcissus filled all the meadows, it was too late for many of the earlier things. I am not now to write of flowers, but it is impossible to pass over without a word of grateful recollection, the exquisite display in the fields and woods, and also in the gardens, of the most luxuriant growth it is possible to conceive. Except where the vine was cultivated, the Spanish chestnut reigned almost alone, but, whatever its merits, I do not think it is productive of many good insects, especially in the earlier part of the year. On the Sacro Monte there is a wood of very fine pines with a mixture of beech and oak and a grand row of clipped hornbeam, forming an avenue up the main ascent. Of course, though Orta was our temporary home, many expeditions were made to neighbouring places, as Valle Strona, Val Anzasca, and Crevola, and as far as possible, without overburdening my notes with localities and dates, I will notice what captures or observations refer rather to these places than to Orta.

The Sacro Monte itself, a sort of small private elevated park attached to the hotel, is excellent ground, but the best places in the immediate neighbourhood, so far as I learned to know them, were, first, about a mile below Orta, just over the railway on the road to Carcegna, and, secondly, in the valley behind the viaduct at Pettenasco. These three places had between them, more or less abundantly, every species, except *Libythea celtis*, which I took, unless it may be *Argynnis* var. *cleodoxa*. But as I neglected these spots for more distant rambles towards the end of our stay, *A.* var. *cleodoxa* and many more things with which I did not meet may be there. With this preface I will plunge at once into a detailed list of what I saw.

Hesperides.—*Spilothyrus althaeae* was generally distributed in the locality and more particularly in the Strona valley. It is a vexatiously difficult insect to secure. *S. lavaterae* was very fine in most places towards the end of our stay. *Syrichthus carthami* fairly abundant, and quite ordinary in form; *S. fritillum?* var. *alveus*, I think, was present at Orta; *S. sao* was fine but not common; *S. malvae*, abundant; *Nisoniades tages*, more or less generally distributed, and very common at Varallo; *Thymelicus thaumas*, and *Pamphila sylvanus*, abundant, but for *P. comma* we were, I suspect, too early. In the Anzasca valley I took one *Cartocrocephalus palaemon*, a very dark and dingy form.

Lycænides.—Among the blues I had hoped for great sport, and many new forms, but results led to the opinion that the Rhone valley is much more interesting in this respect, but better things would have been done no doubt a month later. My first anxiety was to obtain *Polyommatus orion*; I found the first on May 16th, about two miles up the Val Anzasca, but by no means in good condition; it appears, however, to have a continuous succession of emergences, and from first to last I managed to get together a fairly long series of good specimens—but *all* very much smaller than some from Crevola, taken by a friend in

July. It is present all over the district; I took one excellent one at Orta, it is abundant in the Val Anzasca and Val Strona, and, on the Simplon route, I have found it all the way from below Crevola, directly the road begins to rise from the plain, up to Varzo. It very rarely, however, flies over the roads as do other blues, and never, that I observed, suns itself on the patches of moisture with *Nomiades semiargus* and the rest. To obtain it, it is necessary to ascend to the little flowery platforms which always line the sides of the rocks above the carriage way. *P. baton*, one only of this little beauty was obtained at Orta, near the railway. On this same ground *P. bellargus* was plentiful (the males generally with well-marked black dots on upper side of underwings, not so usual in Rhone valley) the female—with a few ab. *ceronus*—was quite as common as the male, *Plebeius aegon*, and later *P. argus*, the latter having remarkably dark undersides, and large metallic spots, many of the females being specially noticeable. The males of *P. aegon*, in early May, on the Sacro Monte, were very fine, rich in colour, very deeply bordered with black, throwing into bold relief the white fringe—and, on the underside, bases well powdered with blue—the orange band of the hindwings broad and brilliant, but never continued more faintly on the primaries as in most specimens of *P. argus*, its place on the upper wing (underside) being taken by a smoky suffusion. *P. astrarche* was common and with very pronounced red borders not the *allous*-like form so common in Switzerland. *Nomiades cyllarus* was scarce, and in fine condition at Orta during the first few days of our stay—in all I took four males and three females, and one of the latter in Val Strona—*Polyommatus icarus* showed no pronounced peculiarity, unless it was that it was not obtrusively common, the females were generally of the brown tone with very strongly defined red bands on both wings, sometimes well powdered with blue at the base, but this colour did not spread over the whole surface, as is generally the case here in Guernsey, especially in the autumn brood, after the manner of *P.* ab. *ceronus*. *Nomiades semiargus* was not so common, as it probably would be later in the season, but was large and very fine in colour. *P. corydon* was to be taken at Crevola on June 6th, whilst *Cyaniris argiolus* was common all round, and *Cupido minima* at Varallo and Orta. Among the coppers, we had abundance of *Chrysophanus dorilis*—of the very finest—the females very yellow and clear in markings and colouring above and below, so different from my Aigle specimens that I thought I had got something new. *C. phlaeas* was present in fair numbers but in the commonest forms, although occasionally I took a magnificent female with a great increase of the caudation of the hindwings, and much suffused with black, approaching var. *cleus*. *C. alciphron* var. *gordius* was just appearing as we left, in the Strona Valley. With the Theclids I had no luck, only very fine specimens of *Callophrys rubi* appearing. Most of these had the white spots of the underside very slightly represented.

Erycinides.—*Nemeobius lucina*, the size and rich colouring of some specimens obtained at Pettenasco, on June 5th, surpass anything in my experience of the species, the largest being just one and a half inches across.

Papilionides.—*Papilio podalirius* was very ragged on our arrival, as also *P. machaon*, of the latter a new brood began to appear at the beginning of June, but not var. *aurantiaca*, of which I had vainly dreamed! *Parnassius apollo* appeared of course in due season, and *P.*

mnemosyne was in exquisite condition and very abundant just below Ponte Grande on May 19th, which to me was surprisingly early. On going again, June 12th, I could not find one.

Pierides.—Besides the typical *Pieris brassicae*, *P. rapae*, and *P. napi*, there was at Orta a large female form of the latter, closely akin to ab. *napaeae*. *Euchloë cardamines* was everywhere, and *Leucophasia sinapis* very common, but presenting no marked peculiarities. *Gonopteryx rhamni* was sometimes seen, but, alas! not *G. cleopatra*. An early brood of *Colias hyale* was not uncommon at Orta, one of which I secured as being of the richest colour I have ever seen, and with the black spot in the centre of the forewings remarkably dark and large. *Aporia crataegi*, of course, was abundant, and one specimen from Orta, a male, is very beautifully shaded with smoky-black all round the outer border of the forewings—ab. *suffusa*, Tutt. Many others approach this form, but none equal this particular specimen.

Libytheides.—To obtain *Libythea celtis* was an ambition which was to be gratified. At Crevola, on May 26th, I took one battered specimen and saw no others, and feared that I was to be indebted to friends for this species, but, on June 12th, in the Val Anzasca I took, in conjunction with one *Carterocephalus palaemon* and several good *Polyommatus orion*, one perfect *L. celtis*. The next day I went again and it rained persistently, and my only capture was one *Macaria alternata*. It was not until June 15th I could take train again for Piedimulera. Starting up the valley I soon saw and missed *L. celtis* almost in the village. Going further, and beyond the tunnels, I was more fortunate, and took five specimens which leave little to be desired in the way of appearance. This same day *P. orion* was very worn. *A.* var. *cleodoxa* was well out, and I secured an aberration of *Coenonympha pamphilus*, of which more anon. *L. celtis* when out seems to be a sure find in the neighbourhood of its food-plant wherever it occurs, and never to wander far from it. Though wild cherry is given as another pabulum of this species it would seem to be only so by accident and where *C. australis* is in possession, as the wild cherry is to be found generally over the lower alpine area, but not *L. celtis*.

Nymphalides.—Many miles I tramped through chestnut woods in the surrounding hills and valleys of Orta for *Neptis lucilla*, but either it was not there, or it knew that I was, for I saw none. Again probably we were too early. Of the Vanessids, *Polygonia c-album* was common, and *Aglais urticae* bright but quite normal. *Vanessa io*, *Euranessa antiopa*, *Pyrameis atalanta*, and *P. cardui*, all with wings which had seen much service, not a specimen of "cabinet rank" among the lot. *Melitaea cinxia* was fine, close to Orta, and *M. phoebe* was abundant, and mostly worn by May 16th, but I brought back a small series because they are so much lighter in colour and generally smaller than the splendid fellows of Bérisal and St. Nicholas in July, and the still grander forms in the same month at Iselle, two of which latter, captured last year, I should almost venture to label var. *occitanica*, Stgr. Possibly the spring brood is less brilliant than the midsummer contingent. At the same date *M. didyma* was well out, and of the most brilliant colour. The females very handsome and inclining to the type form rather than to var. *alpina*, but scarcely "clay cold yellow" as Kane describes the type, which is a form I have not seen, or colour terms represent very different ideas to different people; but the

Melitaea of the district was undoubtedly *athalia*: this abounded in its brightest garb, with strongly defined black rays. *M. parthenie* was probably present, but I have brought none home. *Brenthis euphrosyne* was common, as also *Argynnis lathonia*. Of the larger fritillaries, *A. aglaia* was the first to show up on June 11th in the Strona valley, followed on the 14th by *Dryas paphia*, *Argynnis adippe* and var. *cleodoxa*. Of the Satyrids, *Melanargia galatea* were nearly all very dark, of the var. *procida* form. Piedmont is given as a locality for *M. syllius*, but any expectations I had formed were doomed to disappointment. The Erebiids had not begun to arrive before we left on June 17th, with the exception of two *Erebia crias*, taken June 6th at Crevola, I do not think I saw other of this genus. *Satyrus semele* was out in mid-June and also *S. actaea* var. *cordula*. *Pararge maera* and *P. megaera* were present together and of fine colour, *P. egeria* was of our ordinary English form, *egerides*. *Epinephele ianira* abounded, and at Orta I took a very nice male with dark cream-coloured underwings. *Enodia hyperanthus* was not uncommon round Orta. Of the Cœnonymphids, *Cœnonympha arcania* and *C. pamphilus* were very numerous, especially on the Sacro Monte. The first was of a very rich form, many lacking the apical spot on the underside of the forewings, ab. *obsoleta*, Tutt, in which case, too, the metallic line was generally absent. The dark outer border of *C. pamphilus* varied much, a few specimens approaching very nearly to ab. *lyllus*, Esp., with the eye-spots, underside of hindwings, pupilled white, but not well defined, but one specimen I am inclined to regard as the greatest prize of the whole holiday—it is rather large, of a soft cream colour all over, with a slight opalescent glaze, well-defined but not very dark borders to all wings, the apical spot large, but faint above, clear and beautifully pupilled on the reverse. This I captured, as mentioned above, in the Val Anzasca—it is in excellent condition.

I must not burden this long account with any further lists of moths observed, though I think an expedition devoted to Geometrids and Crambids, in this locality, would richly reward the diligent man. *Saturnia pyri* and *Sphinx pinastri* were common both at Orta and Varallo, and the little *Heliaca tenebrata* at Orta.

ORTHOPTERA.

A few Orthoptera from Starnberg.—At Starnberg, a village on the lake of that name, a short distance south of Munich, I took a few Orthoptera on July 17th-18th. The season was early and I had no time to collect carefully, but yet found *Chrysochraon brachypterus*, Oesk., in numbers; although dirty brown when dried, when alive it is very beautiful, of a brilliant golden-green which shows up very distinctly in the grass and heather in which it is found. I took also *Stenobothrus parallelus*, Zett., *S. lineatus*, Panz., *S. viridulus*, L., *S. bicolor*, Charp., *Locusta viridissima*, L., larva, *Tettix bipunctatus*, L., *Decticus verrucivorus*, L., very common, and *Platycleis roeselii*, Hagenb., was numerous in grassy fields.—M. Burr, F.Z.S., F.E.S., Dormans Park, East Grinstead.

Meconema brevipenne, Yers., in a railway carriage.—While travelling from Fiume to Vienna on the night of August 15th-16th, I was surprised to find a *Meconema brevipenne*, Yers., ♀, crawling on the

seat of the carriage near Wiener Neustadt. The species does not occur naturally so far north, and must certainly have entered the train when we were passing through Croatia or Slovenia. It is a flightless insect, and how it could have made its way into the compartment is a mystery, and, in spite of its frailty, it must have survived the night in a crowded carriage. Its occurrence in the Trieste-Vienna express affords a clue to the explanation of rare Orthoptera far out of the bounds of their natural distribution. *M. brevipenne* is far from being a common form, but occurs in some numbers in the Riviera, Italy, the South Tirol, and Krauss has taken it at Trieste, whence the train came, at Fiume, and also at Laibach, a town through which we had passed during the early part of the night.—Ibid.

The Locust pest in the Dobrudja.—In the *Bulletin de la Société des Sciences de Bucarest*, An. ix., No. 4, 1900, M. Montandon discusses* the locust pest in the delta of the Danube. Although the eminent rhynchotist has not before published observations upon Orthoptera, he has diligently collected insects of this order, and amassed a basis for an account of the Orthoptera of Roumania. Acting upon the instructions of the Ministère des Domaines, he studied the locusts in the Dobrudja, and the work in question is his report. The species which came under his notice was *Pachytylus migratorius*, L., but it was not so much an invasion as an unusual abundance of the insect in its natural home. The young larva hatches from the egg towards the end of April, and reaches maturity between July 15th, and August 15th. The best time to attack them is when they are quite young and feeble. They are then found in quantities together and may be isolated into companies by little ditches, and then crushed wholesale. When older, they are more independent; they separate more from each other and are strong and active enough to climb or leap over obstacles. The favourite breeding-place in the Dobrudja is a belt of old sand-dunes, rarely more than a few kilomètres broad, where the females can easily deposit their ova in the soft ground. M. Montandon combats the theory that migrating swarms return to breed in their original haunts, and favours the opinion that they propagate their kind in any suitable spot. As to means of extermination, the author deprecates the offering of rewards for eggs, by weight, as being waste of labour which might be better employed elsewhere. He strongly advocates the absolute protection of birds which prey upon the locusts. As an example he cites *Pastor roseus*, which greedily devours these insects, but being shy, has been frightened away from the country by the noise of guns. Instead of being one of the most familiar birds of the district, it is now almost unknown. M. Montandon, therefore, very rightly recommends the prohibition of shooting in infested places. It is known that the ova hatch intermittently from the beginning of May till the middle of June. It is often asserted that they hatch soonest in dry grounds, but the author affirms, from his experience, that while the larvæ are very young in the dry upland parts, near the swamps and in marshy grounds they are far more developed. On the occasion of the recent plague, troops of soldiers were despatched to collect and destroy the larvæ, but they arrived too late, when the insects were already strong and active. The author, therefore, further recommends that

* *Les Acridiens du Delta du Danube*, par A. L. Montandon.

in future troops should be sent the moment the eggs begin to hatch. As the grounds infested are desolate and barren, far from any village, the commissariat becomes an important question. A thousand men, with officers, should go thoroughly equipped with food, fuel, tents and water, to conduct a regular campaign against their tiny but innumerable enemies.—M. Burr, F.Z.S., F.E.S., Dormans Park. *October* 10*th*, 1900.

COLEOPTERA.

Coleoptera in the mountain districts of Cumberland.—In the June number of this magazine (*antea*, p. 159) I published some notes on collecting in Castle Carrock Fell in May. Since then I have had several fairly successful trips to other of the mountains of Cumberland, and I purpose here to mention some of the species with which I have met. Whit-Sunday was one of the few really fine days we have had in the north this year, and it was a party, full of expectation, which, in the early morning, drove up to the village of Ousby from Langwathby on the Midland Railway, to sample the insect fauna of Cross Fell, the highest point of the Pennine range, which, in all probability, had not before been explored by an insect hunter. The coleopterists of the party were Mr. Harry Britten and myself. Cross Fell lies in the south-eastern corner of Cumberland, and reaches an altitude of 2930ft. Late in the season though it was, there was still a lot of snow lying about. We ascended the Fell from its western side, following the course of a small stream, which we ultimately found had its source high up on the left shoulder, near some old ore workings. Not far from the foot of the mountain the stream crosses a rough cart-track, broadening out into a pool, and here our first noteworthy capture was made, *viz.*, *Hydroporus davisii*, Curt., which was tolerably common, but not easy to get, owing to the shallowness of the water, which prohibited the use of the water-net, so that captures had to be made with the hands. *H. rivalis*, Gyll., also occurred, with *Haliplus lineatocollis*, Marsh., and commoner things. Pursuing our course we soon came across *Corymbites cupreus*, F., on the wing, mostly var. *aeruginosus*, F., which was in hundreds almost to the summit, all but one or two, however, being males. By working the thick moss in the stream, some nice things occurred, as *Stenus guynemeri*, Duv., and *Quedius auricomus*, Kies., neither species, however, in any number. Other species, occurring contemporaneously with these, were *Lesteva pubescens*, Mann, *L. longelytrata*, Göeze, *Myllaena brevicornis*, Matth., *Elmis aeneus*, Müll., and *Hydraena gracilis*, Germ. In pools near the summit, *Agabus conspersus*, Payk., and *Hydroporus morio*, Dej., were obtained, with a lot of common things. Very few *Geodephaga* were to be had by stone-turning, except *Nebria gyllenhali*, Sch., and *Patrobus assimilis*, Chaud. A nice weevil, however, *Otiorrhynchus maurus*, Gyll., was a gratifying capture, and though only four perfect specimens were found, judging by the quantity of dead and broken remains we saw, it must be common on this mountain. Probably we were too late for it. I visited this locality again three weeks later, but my collecting was spoiled by a heavy rain-storm, the like of which one only experiences in these remote regions. However, a nice series of *A. conspersus*, Payk., was obtained, and *A. arcticus*, Payk., *Henicocerus*

exsculptus, Germ., and *Homalium iopterum*, Steph., added to the previous list. *Telephorus obscurus*, L., was not found on either visit, though specially looked for. As yet I have only taken it on Bleaberry Fell, near Keswick. I spent July 3rd and 4th, in the Lake district with a lepidopterist friend, being quartered at Seathwaite, at the foot of Sty Head Pass, the famous haunt of *Melampias epiphron*. My time was occupied in working the ground round Sty Head and Sprinkling Tarns, the wood near the base of Green Gable and the rough slopes of Stake Pass, where the River Derwent rises. This district has the reputation of being the wettest in England, and it fully kept up its reputation while I was there, consequently my list of captures was not extensive. *Carabus glabratus*, Payk., was almost common and ran about among the grass actively. *C. arvensis*, F., *C. catenulatus*, Scop., and *C. violaceus*, L., also, were tolerably common, some of the latter being without the violet margins. *Pterostichus vitreus*, Dej., was common enough, and one *P. aethiops*, Panz., the first I have taken among the Lake mountains, was obtained. *Taphria nivalis*, Panz., occurred sparingly and was always immature. *Agabus congener*, Payk, and *A. arcticus*, Payk., were not uncommon in small pools, but had to be persistently worked for, and a good many were imperfect. *Hydroporus morio*, Dej., was present in limited numbers, *H. obscurus*, Sturm, being more frequently in evidence. Three *Orthophagus fracticornis*, Payk., were taken in dung, *Aphodius lapponum*, Gyll., of course, being abundant. *Dascillus cervinus*, L., and *Podabrus alpinus*, Payk., occurred about brackens, as also did *Phyllopertha horticola*, L., in immense numbers. To the dalesmen it is known as the "bracken clock." *Hoplia philanthus*, Füss., was equally abundant, affecting the little mounds made by a species of yellow ant—*Lasius flavus*, I think. One or two specimens, indeed, were found inside the mounds, which suggests that the species has myrmecophilous proclivities. *Corymbites cupreus* var. *aeruginosus*, F., occurred under stones, all females this time. On the sloppy ground contiguous to Sty Head Tarn a few beautiful *Donacia discolor*, Panz., were found. Running nearly parallel with the Pennines, but about ten miles to the west, are a short range of low hills, known as the Lazonby Fells, which nowhere reach a greater altitude than 1000ft. They really form one extensive moorland, with here and there a patch of fir wood and a little birch. In company with Mr. Britten I have spent several days here during the past season, and among the beetles taken, the following may be mentioned: *Bembidium nigricorne*, Gyll., abundant on bare places among the heath, but very local and only taken in April and September. *Trechus secalis*, Payk., common under stones near a small pond. *Calathus fuscus*, F., not uncommon in a corner between two walls, surely a strange place for this maritime species. *Dytiscus punctulatus*, F., several. *Placusa complanata*, Er., under fir bark among the burrows of *Rhyncophora*. *Trox sabulosus*, L., and *Omosita depressa*, L., common in dry carrion. *Corymbites tessellatus*, F., a few swept. *Sericosomus brunneus*, L., not uncommon on the wing in the sunshine. *Pissodes pini*, L., common under fallen fir branches. *Cymindis vaporariorum*, L., was met with in some numbers by Mr. Britten in the early spring, but has not been seen since.—Frank H. Day, F.E.S., 6, Currock Terrace, Carlisle. *October 13th*, 1900.

"Notes pour la classification des Coléoptères" (by Aug. Lameere, Professeur à l'Universite de Bruxelles. *Ann. de la Soc. Entom. de Belgique*, Tome xliv., 1900).—These notes are the first real attempt at a natural classification of Coleoptera, and although we are not prepared to admit all the innovations which occur in this paper, we do not hesitate to say that on the whole we agree with it, and welcome it as a step in the right direction. As M. Lameere says himself, a zoologist entirely ignorant of entomology and approaching the study of insects at the present day, would deplore the absolutely rudimentary state of their classification; whereas, in other groups of animals, naturalists have for some time past based* their classification on genealogy, the only natural mode of classification, entomologists, with a few rare exceptions, do not seem to realize the immense progress outside their domains, and perpetuate the errors of the past. This, alas! is undoubtedly true, so far as coleopterists are concerned, although the leading lepidopterists are not likely to assent to such a sweeping assertion. As long as arbitrary and unnatural characters are used for classificatory purposes, or species are divided on one character alone (which must in itself be arbitrary and unnatural, as the workings of evolution cannot be tied down to any one character) classification will remain practically in the state in which Linné left it. M. Lameere truly says that, in spite of such improvements as have been made, the classification of Coleoptera remains perhaps the most difficult problem in systematic zoology, and points out that his notes are intended to direct the attention of specialists to this subject. This is an end to be devoutly hoped for, as many coleopterists appear to think that the *alpha* and *omega* of the study of Coleoptera is to form a collection, others, the description of new species, whilst all the interesting problems presented by the life-histories of beetles, their habits, courtships, parasites, mimicry, dwelling-places, &c., are as nothing to these great objects. They think that, because the older collectors collected in a certain way they must do likewise, strike out no new lines for themselves, present all difficulties to the authorities by reputation pro tem., never try to sift or find out truths for themselves, follow like sheep in each other's footsteps, and, in fact, as M. Lameere says, perpetuate the errors of the past. A friend of ours, a coleopterist, who like ourselves, only keeps such beetles in his own private British collection as he takes himself, was accused of being selfish (when he gives away every insect he takes, except a small series) and unscientific! When he explained that he could always study whatever insects he wished in the museums or in friends' collections, and that if it were absolutely necessary to have a type collection he could buy one to-morrow, he was told that he had better study some other order. This could only mean that the one object of any value was to amass a collection no matter how, and that the experience and knowledge obtained in the field was worth nothing. However, "revenons nous à nos moutons." In these admirable notes the thing that strikes one at once is the amount of study displayed and the

* This calls to mind Professor Poulton's words in his learned address to the Zoological Section of the British Association at Liverpool in 1896: "Since the appearance of the 'Origin of Species' the zoologist, in making his classifications, has attempted as far as possible to set forth a genealogical arrangement."

clearness and distinctness with which the conclusions contained therein are stated. This notice is not intended as a translation, and space will not permit of our going into the reasons for the conclusions reached, and the many alterations from the existing order which one finds. We can only recommend coleopterists to study them for themselves, but to give a few extracts is necessary. M. Lameere suggests that the ancestor of Coleoptera should have had the following characters:

I.—(1) Complete metamorphoses. (2) Four malpighian tubes. (3) The mouthparts adapted for biting. (4) A large and free prothorax. (5) All the tarsi five-jointed. (6) A pad between the tarsal claws. (7) Three ocelli. (8) Eight visible segments to the ventral surface of the abdomen. (9) All the coxæ conical and projecting. (10) The antennæ with eleven similar joints.

II.—This ancestor was a Neuropteron of the Planipennes group; it should have lived under bark, or bored into trunks, and with such habits the usefulness of the transformation of the upper wings into elytra is evident. He then proceeds to divide the Coleoptera into three suborders, to which he gives the names, Cantharidiformes, Staphyliniformes, and Carabiformes, which are separated by the neuration of the wings. These again are subdivided, as is shown in the table appended, facts and arguments being presented in the notes to support their position. We have not here whole groups of families which have no connection whatever with each other, bundled together under such names as "Polymorpha," &c., as has occurred in a recent scheme of classification.

One point, however, will no doubt meet with considerable opposition, and that is the *Pulicidae* being placed in the Staphyliniformia, from the general source of which M. Lameere considers that they are derived. In the *Ann. de la Soc. Entom. de Belgique*, tome xliii., 1899, he remarks:—"As for the fleas, regarded nearly unanimously as Diptera, I have no doubt they are Coleoptera of the group Staphylinoides *sensu* Ganglbauer. Heymons has demonstrated definitely that they are not Diptera . . . . but in proving that the unpaired appendage of the mouth is only the labrum, he has removed the last barrier which hinders their being considered beetles; they have, in fact, eleven-jointed and not three-jointed antennæ, contrary to all the descriptions, and this character leaves no doubt as to their parentage."

M. Lameere gives at the end of his paper a table of his scheme of classification which we here reproduce:—

COLEOPTERA.

STAPHYLINIFORMIA.

Silphidae.
- Silphiinae.
- Clambinae.
- Sphaeriinae.
- Hydroscaphinae.
- Scaphidiinae.
- Corylophinae.
- Trichopteryginae.
- Scydmaeninae.

Histeridae.
Staphylinidae.
Pselaphidae.
Platypsyllidae.
Pulicidae.

CARABIFORMIA.

Rhysodidae.
Carabidae.
Paussidae.
Dytiscidae.
- Omophroninae.
- Haliplinae.
- Amphizoïnae.
- Hygrobiinae.
- Hydroporinae.
- Dytiscinae.

Gyrinidae.

CANTHARIDIFORMIA.

Teredilia.
Lymexylidae.

Cantharidiformia.
Teredilia.
Anobiidae. (Anobiinae. Ptininae.
Bostrychidae. (Lyctinae. Bostrychinae.
Cupesidae.
Derodontidae.

Malacodermata.
Cantharididae. (Cantharidinae. Lycinae. Lampyrinae. Drilinae.
Melyridae (Malachiinae. Melyrinae. Corynetinae. Clerinae.

Sternoxia.
Dascillidae. (Dascillinae. Chelonariinae. Eucinetinae? Cyphoninae?
Elateridae. (Cebrioninae. Perothopinae. Eucneminae. Cerophytinae. Soleniscinae. Elaterinae. Throscinae.
Buprestidae.

Macrodactylia.
Parnidae. (Psepheninae. Parninae. Elmidinae.

Brachymera.
Dermestidae.
Byrrhidae. (Byrrhinae. Notodendrinae?

Palpicornia.
Hydrophilidae. (Helophorinae. Hydrophilinae.

Clavicornia.
Nitidulidae. (Hypocephalinae Sphaeritinae. Trogositinae. Nitidulinae. Byturinae.
Mycetophagidae.
Cisidae? (Sphindinae? Cisinae.
Erotylidae. (Cryptophaginae. Erotylinae.
Phalacridae.
Colydiidae.
Lathridiidae.
Endomychidae. (Mycetaeinae. Endomychinae.
Coccinellidae.
Cucujidae. (Cucujinae. Helotinae.

Phytophaga.
Brenthidae.
Crambycidae.
Chrysomelidae.
Bruchidae. (Bruchinae. Anthribinae.
Curculionidae.

Heteromera.
Tenebrionidae.
Melandryidae. (Melandryinae. Mordellinae. Rhipiphorinae. Stylopinae.
Lagriidae. (Lagriinae. Pythinae. Pyrochroïnae. Meloïnae. Oedemerinae. Anthicinae.

Lamellicornia.
Lucanidae. (Lucaninae. Troginae.
Scarabaeidae. (Scarabaeinae. Melolonthinae. Dynastinae.

—H. D.

Coleoptera at Roughton, Norfolk.—I spent a fortnight from August 18th at a farmhouse in the village of Roughton, about four miles from Cromer on the Norwich Road, and did a little collecting at odd times, but as I did no really serious work my captures were neither numerous nor very striking. Off the gorse and heather on a common between the village and Cromer, I swept *Luperus nigrofasciatus*, Goeze; *Coccinella hieroglyphica*, L., and *Strophosomus retusus*, Marsh., but sweeping, as a rule, produced nothing. By shaking over paper, dry grass, and refuse lying under the hedges in a field belonging to the farm I obtained the following:—*Otiorhynchus scabrosus*, Marsh.; *O. raucus*, F.; *O. muscorum*, Bris.; *Hypera variabilis*, Hbst.; *H. polygoni*, L.; *Sitones hispidulus*, F.; *S. crinitus*, Ol.; with many common species of Apions and other weevils. In the same way were procured *Harpalus puncticollis*, Pk.; *H. punctatulus*, Duft; *Amara bifrons*, Gyll.; *A. apricaria*, Pk.; *Notiophilus substriatus*, Wat.; *Lebia chlorocephala*, E.H.; *Helophorus nubilus*, F.; *Quedius picipes*, Man.; *Stilicus subtilis*, Er.; *Chrysomela staphylaea*, L., &c. A single

specimen of *Taphria nivalis*, Pz., was picked up running on the road just at dusk one evening. Mr. Edwards records only one specimen as having been taken (in a similar way) in the county up to 1893, at Lakenham. *Stilicus subtilis*, of which two specimens were taken at different times, is not given in Edwards' list for the county of Norfolk, so I presume this is a fresh record; for several others there are only a few county records; *L. nigrofasciatus* is given for Mousehold Heath only, and as not common; my locality is north of this, and it was by no means uncommon, I secured my series in a very few minutes.—T. Hudson Beare, B.Sc., F.R.S.E., F.E.S., King's Road, Richmond, Surrey. *November 3rd*, 1900.

Bembidium stomoides, Dj., in Yorkshire.—I found a specimen of this scarce Bembid, on the banks of the Wharfe in the woods of Bolton Abbey, Yorkshire, on September 12th.—Ibid.

Probable myrmecophilous habits of the genus Astilbus.—In the *Deutsche. Entom. Zeitschr.*, 1894, p. 274, Father Wasmann writes "On May 3rd, 1893, I found at Linz an *Astilbus* running on a path in a field with a dead *Myrmica laevinodis* in its mouth." This record will call to mind a similar capture made by myself at Chiddingfold, and recorded *ante.*, p. 238.—H. St. J. K. Donisthorpe, F.Z.S., 58, Kensington Mansions, South Kensington. *November 22nd*, 1900.

Aberration of Telephorus rusticus.—I have in my possession a ♂ specimen of *Telephorus rusticus* without the black spot on the thorax, which I took *in cop.*, with an ordinary ♀ in the New Forest in June, 1891.—A. J. Chitty, M.A., F.E.S. *November 22nd*, 1900.

NOTES ON COLLECTING, Etc.

Lepidoptera at Wicken.—On August 20th, I joined my cousin, Mr. F. H. Pilleau, at Soham Station *en route* for Wicken, for a couple of days' fen collecting. My cousin, who has recently revived an interest in butterflies, which has lain dormant for some years, and who had never seen *Papilio machaon* alive, was most anxious to meet with this species in its native haunts, more especially as he had a few days previously been informed by a lady at Felixstowe that she had recently seen six specimens of *Papilio machaon* which had been taken by a gentleman staying in her house, at a place called Bawstead Ferry, near Felixstowe, where my cousin was spending his summer holiday. On arriving at Wicken enquiries elicited the information that *P. machaon* was still about, but that it was nearly over and not in good condition, which I had myself expected. We, however, determined to do our best. It was too late that day to think of butterflies so after a stroll through the fen and the casual capture of one *Plusia chrysitis*, a consultation with my old friend Bailey, and a good dinner, we determined to try what sugar would produce, and, led by Bailey, started out to sugar the trees and posts in the drove. The first thing we noticed on getting to the fen, was that a thick white fog was rising all round—a bad omen—which was realised, inasmuch as, comparatively speaking, there was not very much about. A fair *Catocala nupta* was the first thing bottled off the sugar, and then a specimen of *Tapinostola hellmanni* was secured. *Agrotis nigricans*, *Amathes xanthographa*, *A. c-nigrum*, *A. rubi*, and *A. umbrosa* were in large numbers, and I secured a very pretty series of *A. c-nigrum* to replace my former

ancient specimens. *Calamia phragmitidis* also turned up, but in small numbers, with a few *Heliophila impura*, and, of course, several *Triphaena pronuba* were in evidence, with a sprinkling of *T. subsequa* (*comes*), but, the fog coming on thickly, we soon beat a retreat to our lodgings and beds. The next day was unsettled but commenced fine, and we soon set out for the fen with visions of *P. machaon* before our eyes. These, however, for some time seemed doomed not to be realised, but in the meantime my cousin netted several nice *Hamadryas io* and *Colias rhamni* with an occasional *Aglais urticae* and one *Vanessa cardui*. I saw a specimen of *Eurymus hyale* right in the middle of the fen, but was unable to get within striking distance. Then I missed the first *P. machaon* which appeared, and soon afterwards came across a nearly full-fed larva of the same species. The clouds which had been threatening for some time began to close round the sun and the air became heavy, as though a thunderstorm was coming on, and just in the last few minutes of sunshine I succeeded in netting a splendid female *P. machaon*, quite fresh from the pupa; then down came the rain and we had to beat a hasty retreat to the shelter of a neighbouring cottage, and then home again. The afternoon, which was wet, was devoted partly to setting and partly to inspecting Mr. Bailey's captures during the season, which included one *Hydrilla palustris*, the only one I believe taken this season. After dinner we again sallied forth to try our luck with sugar, and light also this time, as the night was more promising, and the result amply justified our doing so. Sugar produced many more specimens than the previous night though the species noticed were much the same, and we soon got the lamp to work and were busy netting and bottling off the sheet or lamp. When at last we determined to turn in I found I had the following species in my box:—*Tapinostola hellmanni*, common, *Calamia phragmitidis*, *Heliophobus popularis*, *Cidaria testata*, *Ennomos alniaria* (*tiliaria*), *Amathes umbrosa*, *A. c-nigrum*, *A. rubi*, *Acidalia immutata*, *Strenia clathrata*, *Pterostoma palpina* (one), *Agrotis nigricans*, common, *Triphaena subsequa* (*comes*), *Lithosia griseola* with one of the ab. *stramineola*, besides which many other common species were noticed both at the light and at sugar. The next day was fine, but very windy, and although we had at first intended to return that morning, we determined to have another try for *P. machaon*, with the result that we were able to secure some very fine specimens during the morning, one of which, captured by my cousin, measured just upon four inches across the wings. We netted and saw a great many battered specimens, but were able to secure a few very fresh ones. That evening was spent chiefly in setting our previous captures and the next morning saw us again at Soham railway station where we parted to join our respective families, my cousin to Felixstowe, and myself to Hythe, very well pleased with our visit to the fen. It was five years since I had been there, and the memories of former visits were not among the least enjoyable of my experiences this time. I should add that the enjoyment of our visit was very greatly enhanced by the comfortable quarters, excellent food and cooking, and untiring attention, provided for and bestowed upon us by my old friends Mr., Mrs. and Miss Aspland, at the Post Office. I may also mention that many larvæ of *Acherontia atropos* have been found in the Wicken neighbourhood this season. I have since heard from my cousin that he afterwards twice visited Bawstead Ferry and

found *Eurymus edusa* along the coast and cliffs in great numbers, but most difficult to get near. Although unable to come upon any *Eurymus hyale* there, his little boy, aged six, a few days back, secured one (without net) in a road at West Hampstead just off the Edgware Road. I have, in accordance with the Editorial suggestion, *anteà* p. 252, used the synonymy worked out by Mr. Prout in the "London List" (*Trans. City Lond. Ent. Society*, 1899 and 1900).—H. Ainslie Hill, F.Z.S., F.E.S., 9, Addison Mansions, Kensington, W. *October 4th*, 1900.

Lepidoptera in the York district.—The season seems to have been good so far as my limited time has permitted me to get out and work. I had a couple of turns for *Epione vespertaria* larvæ in June, and found them fairly common, and about full-fed by June 21st. The first emergences took place on July 7th—both sexes. Mr. Ash and I spent two pleasant evenings in the middle of July, and they both proved good for *E. vespertaria*, which were flitting freely about between 10 and 11 o'clock. *Geometra papilionaria* and *Acidalia inornata* were also rather common on the same nights. *Abraxas ulmata* aberrations were curiously scarce this year, only one of the leaden-blue form, I believe was seen. I took some very nice aberrations, however, on a second visit with Mr. Ash, one, a great beauty, with the wings slightly suffused, the nervures being white, giving it quite a radiate appearance.—S. Walker, York. *September* 7th, 1900.

Lepidoptera at Oxton.—I do not think *Callimorpha hera* was as common this year as last, but its range has certainly become extended, and I have taken it here this season, between five and six miles from its headquarters at Cofton, and also in the lanes adjoining. *Acherontia atropos* also seems fairly common as I have had five pupæ and two larvæ dug here up to date. *Argyresthia anderreggella* and *Teleia humeralis* were again taken commonly in August, in the same localities as last year, but *Coriscium sulphurellum* and *Leptogramma literana*, which were so common last year, have been very scarce. Sugaring on August 20th, in Dawlish Warren, with Mr. Bower, we took *Lithosia caniola* which I have not seen there previously myself. Has anyone else? Only one *Caradrina ambigua* came to sugar, so I suppose it was scarce here this season, as well as in other places. Later on we took twenty *Acidalia marginepunctata* sitting on grass-stems, and could have taken many more, but had come to an end of our boxes. In July I took about twenty *Eupithecia togata* in a fir wood here, also a few *E. debiliata*, and about thirty *Nemotois minimellus*, a new insect to me. On the whole I should say the season here has been fairly good, but insects have had to be worked for, and certainly the light traps have not paid as well as usual, except for *Lithosia sororcula* and *Notodonta trimacula*, whilst many things one ordinarily looks for have hardly occurred or been entirely absent.—E. F. C. Studd, M.A., F.E.S., Oxton, Exeter. *October 5th*, 1900.

Lepidoptera at Market Drayton and Cannock Chase.—Again following up my notes (*ante.*, p. 301) I have to record that the attractiveness of sugar until August 8th was very marked—*Noctua brunnea*, *N. baia*, *Dyschorista suspecta*, *Cleoceris viminalis*, *Triphaena fimbria*, *Noctua castanea*, and *N. dahlii* were all very numerous, whilst *Triphaena pronuba* and *Xylophasia polyodon* were perfect pests; I did not, however, see many dark specimens of the latter species, only two

could be said to approach black. *Hypenodes costaestrigalis* was commoner than I have ever before seen it and I set some fifty specimens. Of species hitherto unrecorded for North Staffordshire, I took two, *viz.*, *Agrotis obscura* and *Pyralis glaucinalis*, whilst *Xylophasia scolopacina* was taken, a species, of which only one example had hitherto been recorded. Besides *Venusia cambrica* and *Eupithecia debiliata*, *Eucosmia undulata* was in much greater numbers than usual. From August 9th-12th I visited Cannock Chase for *Stilbia anomala* and *Melanthia bicolorata*, which, strange to say, were both below their average numbers. As sugar towards the end of August was of little use, I used, as I have before noted (*ante*, p. 273), a strong light in a peat-bog with much success, and obtained—on August 28th, three *Luperina cespitis*, one *Epione apiciaria*, and numbers of *Noctua rubi* and *Phibalapteryx vittata*; on the 29th, one *Trichiura crataegi*, one ♀ *Ennomos tiliaria* and many *P. vittata* and *N. rubi* (unfortunately on this night I was obliged to leave the spot at 9 p.m., before *L. cespitis* began to fly); on August 30th, a very cold night and rather starlight, only a few *P. vittata* and *N. rubi* occurred, and moths ceased to fly at 9 p.m.; on the 31st, wind west and very rainy, twenty-two *L. cespitis*, two *T. crataegi*, and many *N. rubi* and *P. vittata*; on September 1st, wind north, twelve *L. cespitis*, eight or ten *P. vittata* and *N. rubi*, but nothing came after 11 p.m., whilst nearly all the *L. cespitis* appeared to be quite freshly emerged specimens. With the exception of one specimen the insect has not been recorded from here before, and the date strikes me as being very late. For attracting the moths, I used a large duplex petroleum lamp in square glass box, something like a street lamp, and no upright sheet. Many of the insects settled or fluttered on the glass and were easily boxed. On the ground in front, I had a large white sheet on which most of the *L. cespitis* dropped and waited to have the box put over them; they then immediately walked up and rested on the side of the box. Most of the *N. rubi*, too, were quite fresh specimens, and certainly belonged to a very late second brood. Of the Plusias all but *P. gamma* have been unusually scarce this year in this neighbourhood. I may further add that since my note (*anteà*, p. 273) I have had two larvæ of *Acherontia atropos* brought to me, one on October 5th, and one on October 10th. The latter does not seem healthy, as, though it has turned colour, it has not yet gone down, and seems sluggish; I expect it has been hurt. The former is still small, and feeds on jasmine, as potato leaves are now hard to get. On the evening of October 9th it poured, but sugar was exceedingly good for moths:—Eighteen *Calocampa exoleta*, six *Miselia oxyacanthae* ab. *capucina*, two *Anchocelis macilenta*, *A. rufina* abundant, and in all manners of condition; *Orrhodia vaccinii* swarming, a few *Scopelosoma satellitia*, and two quite fresh *Peridroma saucia*, a species I have only taken here once previously. We get no really good autumn moths, even *Calocampa vetusta* has only been taken three times. Larva-beating has been profitable, in two days I obtained over 70 larvæ of *Hadena contigua*, besides about a dozen of those of *Leiocampa dictaeoides*, a great many *Cymatophora duplaris*, a fair number of *Notodonta dromedarius*, *N. camelina*, *Hypsipetes impluviata* and *Eupisteria heparata*, whilst *Amphidasys betularia* larvæ were especially abundant.—F. C. Woodforde, Market Drayton, Salop. *October* 10*th*, 1900.

Autumnal Lepidoptera in Guernsey.—On July 24th I watched

Lampides boetica, a rather worn male, for some time at flowers of large blue annual lupin, and later, from September 3rd to 14th, I observed a few in the garden, but never more than three at a time. On August 8th I first noticed *Colias edusa*, and took one *Vanessa io*, a very scarce insect here. On August 11th, *Colias hyale* appeared, and on the 13th, *Papilio machaon* caused a sensation by flying wildly about the cliffs at Icart Point. A few days later it was captured and two others were seen. On the 14th, *C. hyale* was more numerous, and by this time *C. edusa* was swarming everywhere, and still visits my garden up to date (October 10th). I secured two very fine *C.* var. *helice* on the 18th and had my pick of any number of the normal form. A larva of the bright green form of *Acherontia atropos* was brought me found feeding on jessamine, and later, from potato, two of the yellow aberration, but none, I fear, were healthy, though they are now pupæ. *Callimorpha hera* has been very abundant, but I have only seen one *Sphinx convolvuli* this year. At sugar I had some success, considering the limited range of work—a few young trees and some tarred palings in my garden of less than half an acre. I began to sugar in the last week of July. I will only mention with dates either the rarer species or such appearances as seem in any way exceptional as to time. *Mania maura* was very abundant from July 26th-August 19th, and was still out on August 30th. Of *Leucania albipuncta* I was fortunate enough to take seven specimens, all in first-class order, one each on the following dates: August 2nd, 23rd, 24th, 25th, 26th, 29th, September 17th, which gives a pretty extended period on the wing. *Calymnia affinis* appeared first on August 8th and then on to the 15th. *Bryophila muralis*, *Peridroma saucia*, and *Cidaria prunata* were captured. I first took the second brood of *Caradrina ambigua* on August 19th (afterwards it was out in hundreds, lasting until September 24th), when I last observed it. *Agrotis segetum* reappeared in wonderful variety on the same date, and *Agrotis puta* became very common, having first shown itself on August 4th. *Peridroma saucia* by this time was common, *P. suffusa* hardly less so, whilst *Noctua rubi* began to come to sugar. Of *Leucania putrescens* I took two—one on August 24th, the other, not so good, on the 31st. Of *Agrotis lunigera* I secured four stragglers from August 29th to September 28th. On September 5th and following days I took two or three *Acidalia virgularia* freshly emerged, which was so late as to suggest a second brood, and on September 28th a very beautifully fresh *Leucania vitellina* ♂ was the crowning prize, followed on October 3rd by an aberration of *Polia flavicincta*, which is a very remarkable contrast to the very dark form which commonly obtains here. The ground colour of the upper wing is so light a grey as to be nearly white, the central band in dark grey is very complete, and the dark, wedge-shaped marks of the ante-marginal ornamentation very strongly defined in the same tone, tipped with orange, but already I fear the orange markings here and round the central band show a tendency to fade. The hindwings are white with darker nervures; the specimen is a male.—(Rev.) Frank E. Lowe, M.A., F.E.S., Guernsey. *October 10th*, 1900.

Lepidoptera at Enfield.—Since my previous note (*ante.*, pp. 271-272) I have nothing much to report in the way of captures except the abundance of *Colias hyale* in clover fields near Saffron Walden. *Colias edusa* was scarce in this locality. Larvæ and pupæ of *Acherontia*

atropos have also been found in fair numbers. Sugar was rather good for a fortnight or so at the end of August and beginning of September. Amongst others, I took *Peridroma saucia*, *P. suffusa*, *Tiliacea citrago*, *Citria fulvago*, *C. flavago*, *Mellinia gilvago*, and *M. ferruginea*, all in plenty, two *Asphalia diluta*, whilst *Anchocelis lunosa* was very common. —H. M. Edelsten, F.E.S., Forty Hill, Enfield. *October* 22*nd*, 1900.

Lepidoptera in Kent and Devon.—This season will be memorable for the number of butterflies seen in this corner of Kent: *Cyaniris argiolus* was common in both its broods; *Argynnis aglaia* in the utmost profusion; *Melanargia galathea*, common, after several years of scarcity, *Polyommatus corydon*, *P. bellargus*, and *Cupido minima* more prolific than usual, and now *Colias edusa*, and its var. *helice*, and *C. hyale* are brightening the clover fields. During a recent visit to Oxton several insects, which do not occur in my district, proved interesting. These were *Peronea cristana*, *Argyresthia anderreggella*, *Coriscium citrinellum*, *Cerostoma horridella*, and *Teleia humeralis*. The *Argyresthia* and *Cerostoma* occurred in fair quantities, the *Peronea* and *Coriscium* only as odd specimens, but the *Teleia* was far from rare and varied to an enormous extent, some examples being nearly black whilst in others the predominant colour was white, there being many intermediate forms. We also secured *Leptogramma literana*, *Zelleria hepariella*, *Psori optera gibbosella* and several common species. All the foregoing were obtained by beating trees and bushes; searching tree-trunks, as is usually the case in this part of Devonshire, proved fruitless. Thatch yielded a few *Coriscium brogniardellum* and a nice series of *Depressaria albipunctella*, as well as several of the commoner *Depressariae*. *Eryatis brizella* was flying freely over thrift in the afternoon at Dawlish Warren, in which locality *Gelechia diffinis* visited our sugar in numbers. Near home again the street lamps have been much more productive than usual, but this may be due to their having been recently fitted with incandescent mantles. These mantles have one great fault, *i.e.*, if the glass of the lantern is broken, and the moths get inside they are generally wasted. The most interesting insect taken was *Mellinia gilvago* which, as far as I can learn, is a new species for the immediate neighbourhood. *Ennomos fuscantaria* and *E. erosaria* were both fairly numerous, though unfortunately in poor condition, and the latter all males. One night five *Eutricha quercifolia* were taken, but no more appeared afterwards. When in search of *Colia hyale*, three *Spilodes sticticalis* were netted, which is I believe also an addition to our district. Sugar on the three or four occasions it could be tried, proved most attractive, record captures being made of *Leucania pudorina*, *Epunda lutulenta* and the sight of a perfect example of *Dipterygia pinastri* and *Euplexia lucipara* in the middle of September was rather a surprise.—B. A. Bower, F.E.S., Langley, Eltham Road, Lee, S.E. *October* 15*th*, 1900.

Lepidoptera at Lyndhurst and Bournemouth.—As an extension of my notes (*ante.*, p. 300) I may state that during July and August sugar was practically useless and light not much better. I spent several week-ends at Lyndhurst and took many Geometrids by dusking, the best being *Acidalia inornata*, *A. trigeminata* (I am now breeding this from ova obtained), *Zonosoma omicronaria*, *Bapta temerata*, *B. taminata*, *Epione adrenaria*, *Ellopia prosapiaria*, *Angerona prunaria*, *Hyria auroraria*, *Phorodesma bajularia*, and also *Lithosia complana*, *L. complanula*, *L. helvola*, *Enistis quadra*, *Calligenia miniata*, and *Cybosis mesomella* (I

captured all these species of "footmen" on the same night). One *Acidalia ochrata*, as noted, was taken in Bournemouth, on July 19th, by the Rev. E. Hallett Todd, and identified by myself; this I think is a new locality. The other remarkable insect, far away from its favourite haunts, was seen about half a mile from this house on September 4th, *viz.*, *Papilio machaon*. *Colias edusa* has been fairly common, with a few examples of the var. *helice*, but *C. hyale* has been rare, only five or six being taken. I have bred a good many imagines from larvæ beaten in the spring, among others, one female *Apatura iris*, *Lymantria monacha*, common, *Zephyrus quercus*, common, *Ennomos angularia*, *Cleora lichenaria*, *C. glabraria*, *Œnistis quadra*, *Boarmia roboraria*, *Nola strigula*, *Catocala promissa*, *C. sponsa*, *Metrocampa margaritata*, *Nola cucullatella*, and *Hylophila prasinana*. The only insects that my moth-trap has produced worth mentioning are, as I have before stated, some nice black aberrations of *Luperina testacea*, but after my last note was written (September 13th) sugar paid much better, and I have taken *Leucania albipuncta* (two), *L. vitellina* (two), *Caradrina ambigua*, *Epunda lutulenta*, *E. nigra*, *Xylina petrificata*, *Triphæna subsequa*, *Noctua glareosa*, *N. neglecta*, whilst *Triphæna fimbria*, *Peridroma suffusa*, *P. saucia*, *Xylina rhizolitha*, *Anchocelis lota*, *A. macilenta*, and *Mellinia ferruginea* have all been more or less common, with *A. lunosa* in endless variety at light, whilst an *Ennomos erosaria*, a few *Epione apiciaria*, *Luperina cespitis*, and *Laphygma exigua* were also taken at light. I may further mention that at sugar I took some grand aberrations of *Orrhodia spadicea* and *O. vaccinii*. For sugaring purposes I have lately been using, with satisfactory results, a mixture of black treacle, beer, methylated spirit, and essence of jargonel.—(Major) R. B. Robertson, Forest View, Southbourne Road, Boscombe, Hants. *October 27th*, 1900.

Lepidoptera at Burnley.—I did not commence the season till after the big storm about the middle of February, when a few mild days occurring I searched for the dark aberration of *Phigalia pilosaria*, but was unsuccessful although some intermediate forms were found; they appeared from February 14th to March 24th, being quite common on the latter date. On April 20th I tried sugar, but found very little doing, one *Calocampa exoleta* being the best. On the 21st *Anticlea badiata*, *Larentia multistrigaria*, and *Hybernia progemmaria* were flying at dusk. May was very cold on the whole and little could be done, larvæ of *Larentia cæsiata* were plentiful on the 19th, but *Plusia* larvæ were very scarce. From June 1st to the 16th *Hypsipetes trifasciata* could be found by searching the alder trunks, while from the 7th to 14th *Smerinthus populi* were emerging in the garden, and were found on the trunks or small branches of the poplars. On June 9th a visit was paid to the moors where *Acronycta menyanthidis* (one) and *Hadena glauca* were obtained from the rocks, and *Fidonia atomaria* abundant on heather. On June 16th I caught the first *Venusia cambrica*, also *Notodonta camelina* and *Larentia salicata*. Another visit to the moors on July 18th produced *Phycis carbonariella*, *Chortodes arcuosa*, *Lycophotia strigula*, *Cidaria populata*, and *Larentia cæsiata*. On July 19th I took *Cidaria pyraliata* in the woods, and at dusk *Apamea unanimis* and *Melanthia ocellata*. In early July *Hepialus velleda* was fairly common, but few of the ab. *gallicus*, while *H. hectus* also occurred. On July 9th at dusk *Melanippe galiata* were flying, also one *Cilix glaucata*. On July 21st *V. cambrica* were common but worn, and a single *Sesia bembeciformis* on a willow

bush. Towards the end of July Plusias were plentiful, and a visit to the nettle beds on the 26th produced *Plusia iota*, *P. pulchrina*, *P. chrysitis*, *P. gamma*, and one *Habrostola triplasia*, while, at the same time, at dusk, *Cidaria fulvata*, *C. pyraliata*, *Acidalia aversata* and its var. *spoliata* were common. In August, I was not able to do anything till the 18th, when *Hepialus sylvinus* on ferns, *Charaeas graminis* on thistles and ragwort, and *C. populata* on bilberry, were found on the moors. From August 25th-29th *Polia chi* was very common, but only one ab. *olivacea* occurred; it is singular that, near Halifax, on the other side of these moors the ab. *olivacea* occurs much more freely. Early September found *Celaena haworthii* fairly common on the 1st and 8th, also a few *Cidaria testata* (a dark form). On the 8th, *Vanessa io* was in splendid condition, *Nonagria fulva* was common, and one *Cloantha solidaginis* was observed resting on a post. September 15th produced one *Anchocelis rufina*, a few *Hydroecia nictitans* on heather, and *Oporabia filigrammaria* on rocks, whilst the same species on the 22nd, but worn, were almost the only imagines left, although larvæ of *Hadena pisi* were rather plentiful. During the season the following appeared in the breeding-cage: March 24th, one *Taeniocampa leucographa*, bred from larvæ found on *Orchis mascula* at Bungay, Suffolk. April 7th, *Hadena pisi* from Burnley. April 21st, *Emmelesia decolorata*, and *E. affinitata* from *Lychnis diurnaca* found at Scarborough. April 30th *Notodonta camelina* on oak at Burnley. May 3rd-4th *Hypsipetes trifasciata* from alder at Burnley. June 11th-15th, *Callimorpha hera* from South Devon. July 7th, *Noctua baia*, *Naenia typica* and *Graphiphora augur* from dock, &c., Burnley. I may add that no less than ten fresh species to the district have been captured, *viz.*, *Calocampa exoleta*, *Habrostola triplasia*, *Cilix glaucata*, *Hepialus hectus*, *Larentia salicata*, *Cloantha solidaginis*, *Bryophila perla*, *Trochilium bembeciformis*, *Vanessa io*, *Hypena proboscidalis*. I have done practically no work at sugar, so naturally Geometrids have been to the fore.—W. G. Clutten, 10, Hallwell Street, Burnley. *October* 31*st*, 1900.

Lepidoptera at Rye.—I was at Rye, Sussex, for a month, during July and August. I sugared for ten days and got nothing, and even *Agrotis tritici* and *A. valligera* on the sandhills appeared to be gone. After the first three weeks I left, and my son then had a really good time. He took quite 150 moths a night on sugar, but mostly common species although some proved useful to fill up gaps. I saw *Colias edusa*, and since then my son has taken *Colias hyale*. Both species were, however, much more plentiful near Christchurch, Hants.—J. Henderson, 2, Birchin Lane, E.C.

Lepidoptera at Newbury, Berks.—During three days (June 4th, 5th and 6th) I made the following captures at Newbury, Berks:—*Nisoniades tages*, *Syrichthus malvae*, *Pamphila sylvanus*, *Cyaniris argiolus*, abundant, *Nemeobius lucina*, *Leucophasia sinapis*, in fine condition, *Brenthis selene*, *B. euphrosyne*, *Pararge egeria*, going over, *Macroglossa stellatarum*, *M. bombyliformis* (the broad-bordered bee-hawk), common at rhododendrons but not so plentiful as in 1899. From July 15th to the 22nd I captured:—*Thymelicus thaumas*, *Plebeius argus*, *Gonepteryx rhamni*, in swarms, *Dryas paphia*, *Argynnis adippe*, *Eugonia polychloros*, *Limenitis sibylla*, in fine condition and abundant on the 15th, but going over on the 22nd, *Hipparchia semele*, *Enodia hyperanthus*, an excellent series. From August 13th-20th, *Colias edusa* was to be found in every

clover field in the district, of the ab. *helice* one only. *C. hyale* was much rarer, I succeeded in taking eight, three ♂ s, five ♀ s. *Pyrameis cardui* was also more abundant than for many years, as were also *P. atalanta* and *Vanessa io*, *Zephyrus quercûs* and *Polyommatus eorydon* were common but worn.—M. F. Hopson, Grove House, Rosslyn Hill, Hampstead. *November 2nd*, 1900.

Lepidoptera at Hampstead.—*Smerinthus populi* may be seen most evenings in May and June flying around the electric arc lamps on Haverstock Hill and Rosslyn Hill. They make huge circles around the light, then suddenly drop with an audible smack on the roadway, when they can be easily boxed. *S. tiliae* does not seem to be so readily attracted by the lamps, but may be found at rest on trees and palings. *Zeuzera pyrina* literally swarmed again during the third week of June, so numerous were they that numbers were picked up each night, crushed by the passing traffic; the females, however, were extremely scarce. Of *Amphidasys betularia*, two dark forms occurred on June 9th. *Cossus ligniperda*, a dead elm tree on the Spaniards' Road yielded a large number of full-fed larvæ. One was found on September 11th in willow. *Catocala nupta* was very common, and it was interesting to note its regular appearance each morning, on the stuccoed east side of the house, never before 9 a.m. and never after 12 (noon). *Eutricha quercifolia*, young larvæ on willow on August 14th. *Smerinthus ocellatus* larvæ were also found on August 24th.—Ibid.

A night's sugaring in Monk's Wood.—On the lovely evening of July 5th I set out for Monk's Wood, Huntingdonshire, on a sugaring expedition, catching the 6 o'clock train from Cambridge to Huntingdon, and the 7 o'clock from Huntingdon to Abbott's Ripton. I arrived at "The Fox Hotel," where I had arranged to meet my friend Mr. E. H. Field at 8.20 p.m. The hotel is merely a strongly built shed with a board nailed on the front on which is the name painted in large red letters. During my walk through the wood I observed *Angerona prunaria* flying in great numbers, although it was broad daylight. I found Mr. Field seated on a plank outside the hotel killing his captures, and learned from him that this species had been flying since 7 o'clock. We first of all dusked in the ridings for about forty minutes and netted many species, *viz.*, *Angerona prunaria*, *Phorodesma bajularia*, *Hemithea thymiaria*, *Numeria pulveraria*, *Selenia illunaria*, *Pericallia syringaria*, *Ypsipetes elutata*, *Melanthia rubiginata*, *Melanthia albicillata*, *Cidaria immanata*, *Calligenia miniata*, *Lithosia mesomella*, *Cidaria pyraliata*, *Cidaria fulvata*, *Anaitis plagiata*, *Cabera pusaria*, *Zonosoma annulata*, *Iodis lactearia*, *Lomaspilis marginata*, *Metrocampa margaritaria*, *Larentia olivata*, &c. Having retired to the hotel and killed these we separated and painted our respective series of patches at a considerable distance from each other, and, after a short delay, I lighted my lantern, and began to box my guests. These I found in large numbers, and by 11.30 p.m. I had filled all my boxes, and then took my way towards my friend's patches, and found him about to leave, also with full boxes. We returned to the shed, and, by the flickering light of a candle, my friend chloroformed the captives and I pricked them with the acid. Our captures comprised the following species:—*Caradrina alsines*, *Aplecta advena*, *Mamestra anceps*, *Noctua festiva*, *Noctua brunnea*, *Cymatophora ocularis*, *Gonophora derasa*, *Leucania comma*, *Agrotis exclamationis*, *Hadena dentina*, *Plusia chrysitis*,

Agrotis corticea, *A. segetum*, *Leucania conigera*, and *Erastria fuscula*. Setting out again we found that the night had grown as dark as pitch, and the air much cooler, but on reaching my round I captured a fine series of *Aplecta nebulosa*, and also *Aplecta herbida*. This time I filled my boxes very quickly, and returned to my friend's patches, and waited until he had filled his, we then repaired to the shed, and killed our takings. On this round we had taken the following fresh insects :— *Thyatira batis*, *Cerigo matura*, *Xylophasia polyodon* (very dark specimens), *X. hepatica*, *Aplecta herbida*, *A. nebulosa*, *Boarmia repandata*, *Gonoptera libatrix*, *Miana fasciuncula*, *Triphaena pronuba*, *X. sublustris*, *Noctua triangulum*, *N. plecta*, *Hadena pisi*, and *X. lithoxylea*. As soon as we had killed these we set out once more, but found the arrivals to be considerably fewer, in fact when I had filled my boxes dawn was breaking and there was no need of a lantern to see to box the insects, I repaired to the hotel and found Mr. Field already there ; this time we had only taken one fresh species, *viz.*, *Agrotis obscura*. Having pinned the insects we rested upon the rough planks, but found sleep impossible, for the birds kept up an incessant chirping, and the morning air was exceedingly cold. Having boiled some water on our little spirit stove, and made tea, we partook of a hearty breakfast, and soon afterwards turned our attention to larva-beating with fair results.—E. Crisp, 31, Union Road, Cambridge. *October 30th*, 1900.

Lepidoptera in South Devon.—I spent my holiday this year in South Devon, but did little entomologically. On July 17th between Exmouth and Starcross I found *Anthrocera trifolii* in abundance in a field near the railway; the confluent form appeared to be fairly common, much more so than at Tenby, the specimens, however, rather worn, a condition that might be expected at this date. At Torquay, where I arrived on the 18th, I obtained *Leucania putrescens* both at sugar and flowers, and also noticed *Agrotis lunigera* and *A. lucernea*, as well as commoner things.—(Rev.) E. C. Dobrée Fox, M.A., Castle Moreton Vicarage, Tewkesbury. *November 1st*, 1900.

Lepidoptera at Marlow in 1900.—Of the insects observed by me during the past season several are, to the best of my belief, new to the locality. In particular *Lithosia sororcula* on a tree trunk, May 27th, *Polyommatus hellargus*, from June 4th-17th, all the females being of the *ceronus* form. *Schoenobius forficellus*, from July 4th-8th ; *Thycis ornatella* and *Spilodes palealis*, on July 28th ; and a solitary *Thecla w-album* sitting in a road in a beech wood on July 27th. Amongst lepidoptera not strangers to the place, *Bapta bimaculata* was seen on June 2nd, and *Oxyptilus parvidactylus* was to be found amongst thyme at the end of July. *Mimaescoptilus phaeodactylus*, which swarmed in 1899, was searched for in vain, but *Vanessa io* was fairly common after an absence of eight years. Both broods of *Cyaniris argiolus* and *Polyommatus astrarche* were unusually abundant, *Dryas paphia* was very scarce, and *Pararge megaera* still scarcer, in fact only one specimen of this once abundant butterfly was seen. *Colias edusa* ♂ was common from August 12th to the middle of September, *C. hyale* did not appear until three weeks later and was in very poor condition, it seemed to prefer stubble to clover fields.—A. H. Clarke, F.E.S., 109, Warwick Road, S.W. *November 5th*, 1900.

Notes on Acherontia atropos.—Referring to my note (*ante.*, p. 275) recording the finding of five nearly full-fed larvæ of *A. atropos* at Margate,

on August 1st, I am glad to report that the whole of the larvæ successfully pupated. The weather keeping very open, I somewhat deferred removing the pupæ from their habitations for the purpose of forcing them. An imago, a male, emerging crippled on the evening of October 18th, I removed the remaining pupæ on the following day. Pending the getting of my forcing apparatus ready, I placed the pupæ on earth in two wooden boxes, having gauze coverings at the top, and removed them to the kitchen, the weather having turned very cold. The pupæ, beyond being very lively, showed no signs of an early emergence of the perfect insects, and I was rather surprised, upon taking a final peep of them at midnight, to find, in one of the boxes, two imagines, a male and a female, on their backs on the earth, kicking violently. How long they had been in this position I cannot say, but possibly for some little time. They had apparently emerged and failed to do what imagines of other species had found no difficulty in doing, that is to climb up the rough wooden sides of the box to the gauze covering at the top. This may have been due to the hooks at the end of their legs with which the species is provided not being suitable for the purpose. The two imagines which had emerged, immediately clung to my finger as it was offered to them in turn, squeaking while doing so. They fancied my rough coat for holding to, but, after some little trouble, and several minutes' delay, I succeeded in getting them to secure a good hold on the gauze. I observed that until they had managed to get a firm hold, their wings did not commence to grow. When I left them at two in the morning neither of the insects had entirely completed their growth nor folded their wings. The remaining two pupæ I placed in my forcing apparatus, and obtained perfect insects from them. The first, a female, emerged on October 24th, during my absence from home, and apparently between 7 and 9 p.m., as at eleven o'clock I found it with its wings folded. The remaining one, also a female, emerged on the following day at 10.15 p.m., I was at home at the time, and observed that, as it came up from the moss in the pot, and climbed up the twigs to the gauze to secure a hold, it squeaked almost as loudly as a mouse does. It was quite two hours after emergence before the insect had finished growing its wings and drying them, and it was not until 12.15 a.m. on the following morning that it had folded its wings. Two of the pupæ measured $2\frac{1}{4}''$ in length, and the remaining three $2\frac{3}{4}''$. I had rather bad luck with the male imago which emerged on October 19th. I placed it in the killing bottle at 8·30 a.m. on the following (Saturday) morning, and on my return from town at 3 p.m. I found it still alive, the killing-bottle having almost entirely failed to act. The insect, moreover, had exuded a whitish fluid, by rolling in which it had completely spoiled its wings. After removing it from the killing-bottle it almost entirely recovered from the effects of the cyanide. This left me with three perfect specimens, all females, two of which measure 5″ across the wings, and the third $5\frac{3}{8}''$. Although I have referred to the squeaking of the insect I am by no means satisfied that this is a correct term to use. The noise emitted appears to me to be produced by a movement of the joints, or some of the joints, of the legs. The curious thing about it to my mind is that apparently the insect can emit the sound or not as it pleases, and it generally does so if alarmed.—A. Russell, F.E.S., Southend near Catford. *October 28th*, 1900.

Acherontia atropos at Bexley.—I had a larva of *A. atropos*, brought me on October 19th, which appears to me to be a very late date. It was found in a potato field, but all the potato-haulm was dead; I was able to get sufficient, however, from my garden for it, and it went down to-day.—L. W. Newman, Bexley, Kent. *October 30th*, 1900.

Acherontia atropos in Guernsey.—A fine female *Acherontia atropos* was brought to me to-day to set for a lad.—(Rev.) F. E. Lowe, M.A., F.E.S., St. Stephen's Vicarage, Guernsey. *October 25th*, 1900.

Acherontia atropos at Hampstead.—On August 8th a full-fed larva of *A. atropos* was brought to me; on the 10th I found two more on a small potato patch. I also heard of several others being found in the neighbourhood. On the 26th a young friend picked up a freshly emerged ♀. One of the larvæ buried on the 21st, next day it re-appeared on the surface of the mould in a shrunken condition, and so it remained for fourteen days before casting its skin. The pupa was at first of a pale yellow colour, but within three days it had assumed its normal tint.—M. F. Hopson. *November 2nd*, 1900.

Acherontia atropos in Essex.—I have some three dozen pupæ of *Acherontia atropos* this year; the first emergence took place October 12th.—(Rev.) C. R. N. Burrows, Mucking Vicarage, Stanford-le-Hope. *October 15th*, 1900.

Acherontia atropos at Pont-de-l'Arche (Eure) in 1900.—I had a larva brought to me in September last which pupated satisfactorily and emerged in October; a second larva, being disturbed during the time it was changing to a pupa, dried up without completing the change. Seven imagines were obtained, one each on September 16th and 30th, and five others between October 1st and 20th. The species is found every year in this district, but generally I obtain only one or two examples (usually brought by peasants or children). The pupa is generally found in September, when the potatoes are being lifted. At St.-Jean-de-Luz, in the Basses-Pyrenees, I took an imago flying at night in a room on August 29th, 1899, that is, a month earlier than the usual time in Normandy.—L. Dupont, 3, Rue de l'Orangerie, Le Havre. *November 22nd*, 1900.

Caradrina ambigua in North Devon.—I captured a specimen of *Caradrina ambigua* on a heath flower at Saunton, north Devon, during the first week of September.—C. Bartlett, 18, Henleaze Avenue, Westbury-on-Trym, Bristol.

Ennomos autumnaria at Ramsgate.—On September 19th I took a male and female of *Ennomos autumnaria* on hawthorn at Ramsgate, both very much worn, but the female has since laid a batch of eggs.—C. W. Colthrup, 127, Barry Road, East Dulwich, S.E. *September 22nd*, 1900.

Unusual visitors at sugar.—On September 8th, I had a card from a friend asking me whether I had ever taken *Dianthoecia cucubali* at sugar, as he had been surprised to find a specimen at sugar the previous evening. I had never done so, but, by a curious coincidence, that very evening one specimen of this (to me) most uncommon insect paid a visit to my sugar, and paid heavily, too, for he got captured. *Plusia gamma* is constantly attracted by my bait, but it was not until September 22nd last, that I took *Plusia chrysitis* in this way. *Stenopteryx hybridalis*, which one is more accustomed to associate with

bright sunshine, has this year been frequently at the sweets, possibly its older name *noctuella* may refer to this habit of night prowling. *Thera variata* has swarmed at sugar also this year, and is still coming. I have been more accustomed to beat it out of fir-trees than take it thus. I do not usually associate the Geometrids with this form of attraction, but have notes in my diary which tend to show that a considerable number of them appear to be quite eager to share with the Noctuids, *e.g.*, *Timandra amataria*, *Zonosoma porata*, *Z. punctaria*, *Z. omicronaria*, *Z. pendularia*, *Melanippe fluctuata*, *Metrocampa margaritata*, *Acidalia promutata*, *A. rusticata*, *A. aversata*, *A. inornata*, *A. emarginata*, &c. I have often asked whether entomologists have noticed the much greater frequency of *Anchocelis lunosa* at sugar now than formerly. In my youth we used to take it only, if my memory serves me, at light, and very poor specimens these were. In 1892 I note its visits to the sugar with a mark of surprise, and this year, in spite of the bright light of the signal-box behind my garden, the insect has been rare there, though exceedingly and unusually abundant at sugar.—(Rev.) C. R. N. Burrows, Mucking Vicarage. *October 3rd*, 1900.

Autumnal specimens of Limenitis sibylla.—For the second time I have taken in Normandy a freshly-emerged specimen of *Limenitis sibylla* in September. Can these have been examples of partial second broods induced by the warm summers of 1899 and 1900?—L. Dupont, 3, Rue de l'Orangerie, Le Havre. *October 6th*, 1900.

Jocheæra alni in September.—On September 14th two specimens of *Jocheaera alni* were brought to me. They were both taken sitting on one tree. Is this not a very late date? I have taken odd specimens here before, but in the month of June.—H. Murray, Lowbank Villa, Carnforth. *September 22nd*, 1900.

Laphygma exigua in South Devon.—I spent the first fortnight of September in South Devon, the only good insect that came to sugar during the time was *Laphyma exigua*.—A. W. Mera, 79, Capel Road, Forest Gate, Essex. *November 2nd*, 1900.

Choerocampa nerii in London.—A few weeks ago, Mr. Ashmead of Bishopsgate Street, E.C., showed me a fine specimen of *Choerocampa nerii*, just brought to him to set, it was found crawling up a lamp post in Queen Victoria St., E.C.—P. G. Sanford, F.I.C., F.C.S., 20, Cullen Street, Fenchurch St., London, E.C. *November 19th*, 1900. [Can our correspondent not furnish us with exact details, *i.e.*, precise date of capture, the name and address of captor, condition of insect, &c.? Another is recorded (*Ent.*) from Teignmouth on October 23rd by Mr. Evans.—Ed.]

Colias edusa and C. hyale in 1900.—Towards the end of August last I was in the Isle of Wight, when *Colias edusa* and *C. hyale* were common in the fields round Parkhurst Forest, *C. edusa* more so than *C. hyale*. I also found both species common along the coast from Sandown to Ventnor, especially along the undercliff. During July I took *C. edusa* in a field near Upper Warlingham Station (L.B.S.C.Ry.).—Ibid.

Colias hyale was common at Penn, Bucks, in August, and was also observed at Beaconsfield and Loudwater.—A. M. Swain, 5, Kelvin Terrace, Sydenham. *November 22nd*, 1900.

We have had *C. edusa* in Cumberland this year. At Maryport a few were taken and one was seen four miles from Carlisle on the banks of the Eden near the Solway Firth. My brother got one also at Monkwearmouth, Durham.—G. Wilkinson, 29, Arthur St., Carlisle.

Colias edusa and C. hyale in Normandy.—In Normandy, *Colias hyale* appears first in May and again in August and September but it is much more common in the autumn than in the spring, in fact, I have but rarely taken it in May. *Colias edusa*, which appears in the spring in Algeria and in the south, is very rare in Normandy at this season of the year, I saw it on June 12th, 1898, on the dunes by the seashore near Trouville, but I have never taken it in the spring at Pont-de-l'Arche, where I have collected continuously for many years; it occurs, however, in August and September and sometimes emerges at the end of July. At Havre it appears late, and I see it every year flying at the foot of the cliffs on fine days at the commencement of October, whilst in 1898 I saw one as late as November 6th. It is true that the locality is perfectly protected against the wind by the cliffs, and is exposed to the south. As to the ♀ var *helice* it is extremely rare in Normandy, and I have only once taken it in this district *viz.*, Pont-de-l'Arche in 1879, in fact, *C. edusa* varies scarcely at all, whilst *C. hyale* varies enormously.—L. Dupont, 3, Rue de l'Orangerie, Le Havre. *November 14th*, 1900.

Colias edusa in Middlesex and Touraine.—*Colias edusa* has turned up here in Middlesex again this year apparently in some numbers. During my absence from home several specimens haunted the garden in July, and others were taken by friends quite close. I noticed that, in the October number of the *Entom. Record*, p. 279, M. C. Oberthür remarks that, in the southern part of Finisterre and in Brittany, both *C. edusa* and *C. hyale* have been rare. On September 18th in a lucerne field just outside Tours to the east, by the banks of the Loire, I found *C. edusa* swarming with countless hosts of *Pieris brassicae;* in fact, since 1877 in the Isle of Wight, I never remember to have seen so many together or in such fine condition. Very little besides was on the wing and the only other insects I came across were a few battered *Vanessa io* which haunted the asters in the grounds of the Paris Exhibition. In Touraine the drought and heat were exceptional I understand during the summer months and the garden crops largely destroyed. The *C. edusa* met with at Tours were, therefore, probably a second brood.—H. Rowland Brown, M.A., F.E.S., Oxhey Grove, Harrow-Weald. *November 15th*, 1900.

Unusual times of appearance of Sphingids.—I captured (August 29th, 1899) a specimen of *Smerinthus populi* flying in the evening around a lamp at St.-Jean-de-Luz (Basses-Pyrenees). As to *Macroglossa stellatarum*, it occurs regularly at Le Havre, and I captured one February 7th, 1899, in my own room. It appears to be common everywhere throughout the country in spring and autumn.—L. Dupont, 3, Rue de l'Orangerie, Le Havre. *November 22nd*, 1900.

Rumia luteolata in September.—Referring to the note (*antea*, p. 304) on the autumnal appearance of *Rumia luteolata*, I may state that I saw the autumn brood of this species in Norwood this year for the first time. The earliest was seen July 18th and the next not until September 6th, after which a few others were observed every evening until the 14th.—A. M. Swain, 5, Kelvin Terrace, Sydenham. *November 22nd*, 1900.

Lepidoptera at Norwood and Sydenham.—It may be worth noting that *Leiocampa dictaeoides* was common at Norwood during August, and that two specimens of *Vanessa io* were captured, one August 17th

and another on September 17th. *Plusia gamma* has, I think, been the commonest moth at Sydenham this year; I saw it in dozens during July, August, and September, more sparingly during October, and yesterday (November 21st) I saw one resting on a fence in Norwood. I have found larvæ and pupæ on scarlet-runner beans, mignonette, sunflower, and Virginia-creeper.—Ibid.

Polyommatus bellargus in Bucks.—In a note supplementary to my paper on collecting in the Chilterns (*Ent. Rec.*, vol. xi., p. 192) I stated that *P. bellargus* appeared to have died out in the locality named. This year I visited the spot on June 9th, and found the butterfly in question in some profusion, the females largely preponderating; a rather remarkable instance I think of recurrence, for, though I have been over the ground often before, I have never seen this particular "blue" there. I may mention that, in addition to *Argynnis adippe* already noted, I took *A. paphia* and *A. aglaia* here, both somewhat the worse for wear, on August 3rd, 1899, as well as *Pamphila comma* in a like condition. These bring up the list of the Rhopalocera for this particular part of the chalk downs to a total of thirty-one.—H. Rowland Brown, M.A., F.E.S., Oxhey Grove, Harrow-Weald. *Nov. 27th*, 1900.

An entomological ghost.—Group of Lancashire and Cheshire entomologists.—Almost from the beginning of time scientists have been credited with having dealings with the devil, and entomologists have not been free from the implication, for it is hardly a century ago since a certain Lady Glanville got into trouble on account of her entomological propensities. Nevertheless it is unusual to find entomologists returning to mother earth to visit their old friends after their departure, yet this is what has recently happened to one well known old Lancashire collector. Always curious in his beliefs, such as the flatness of the world, &c., he would also amuse his friends by promising to revisit them after he was gone, and give them surprises when they were gloating over some new addition to their collection, or feasting their eyes on some unique variety, and now, to their horror, this promise has been fulfilled, for, although dead some 18 months, we have distinct evidence of his being among a circle of his friends last June. In the September number of the *Entomologist's Record* was published a reproduction of a group of entomologists present at Mr. Capper's garden party, and the names were placed under the various portraits. There is one face, however, that is nameless, yet it is there and this is the likeness of the poor old man, now long since dead, looking somewhat sadly over the shoulder of Mr. Webster (*see* Plate IX.), evidently unhappy that he has not been recognised and unable to make his presence known. Although somewhat shadowy, as behoves a departed spirit, the features are all there, clear and distinct—the eyes, nose, mouth, and well-known stubby beard, whilst, partly shaded by the overhanging leaves, his grey hair just peeps out. I leave those who knew old Gregson to decide whether the photographer has done him justice in his spirit form, merely adding that there was no one else visible to the naked eye present, that the negative is absolutely untouched, and that the representation is even more pronounced and distinct in the silver print than in the plate that is re-produced therefrom.—F. N. Pierce, F.E.S., The Elms, Dingle, Liverpool. *October 17th*, 1900.

SCIENTIFIC NOTES AND OBSERVATIONS.

The cry of Acherontia atropos.—Professor Poulton informs me that with the aid of a stethoscope (for both ears) ending in a fine tube he was able at once to locate the sound produced by *Acherontia atropos*. When the tube is placed against the part from whence the cry comes, one is deafened by sound, anywhere else over the body it is very faint. He adds that the noise is produced by air blown into the proboscis from a cavity in the head which opens by a fine aperture into its base. Hence the sound is still made, though fainter and different, when the proboscis is cut off. Professor Poulton, after he had used his stethoscope, read H. N. Moseley's paper on the subject (*Nature*, vi., pp. 131-153), and found that the conclusions arrived at were identical with his own. I see this has been a great year for *A. atropos*. I may mention that the larvæ were very common on potato at Carlton Colville this summer.—Horace Donisthorpe, F.Z.S., F.E.S., 58, Kensington Mansions, South Kensington, S.W.

Prodenia ornithogalli, Guén., bred in Gloucestershire.—A friend near here sent me on July 5th last, a Noctuid larva, much like that of *Mamestra brassicae*. It was found in a case of bananas (probably from the West Indies). On July 12th, after eating a little dandelion leaf, it commenced spinning a slight cocoon among the leaves, and on August 13th a finely-marked Noctuid emerged, different from anything I had previously seen. The moth proves to be *P. ornithogalli*, Gn. —C. J. Watkins, F.E.S., King's Mill House, Painswick, Gloucester. *October 8th*, 1900.

Assembling Smerinthus ocellatus, etc.—The males of *Smerinthus ocellatus* are attracted very readily. On one evening last summer I had three or four females emerge in an outside cage, when a male flew in at the window. Requiring a male to pair with the females I went to the cage and found quite a score of males trying to get into it; this was at 1.30 a.m. I had no trouble in selecting a dozen of these with my fingers. Next evening I isolated several females and found that though there was no male attracted by midnight, and only two by 1 a.m., yet, between the latter time and 1.45 a.m., they arrived very rapidly, and I took many, most, however, in poor order. I obtained males of *Sphinx ligustri* in the same way, as well as males of many other species—*Notodonta ziczac*, *Ptilodonta palpina*, *Smerinthus tiliae*, *Cerura vinula*, *Amphidasys betularia*, many, and it was remarkable that from 1 a.m.-1.30 a.m. seemed to be the time usually selected for pairing.—L. W. Newman, 41, Salisbury Road, Bexley, Kent. *October 30th*, 1900.

VARIATION.

Poecilocampa populi without basal marks.—A specimen of *Poecilocampa populi* appeared to-day without a basal transverse yellow band, although the other transverse line is very distinct, and the fringe very distinctly chequered.—(Mrs.) M. E. Cowl, Aberceri, Spencer Park, Wandsworth Common. *November 1st*, 1900.

Change of colour in pupa of Apatura iris just before emergence.—Referring to Mr. Russell's note (*antea*, p. 294), I may say that I have for several years bred *Apatura iris* from larvæ taken in the New Forest, and have found it to be the invariable rule that the pupæ turn to purplish-blue colour a day or two before emergence. The

empty pupa-skin, after the imago has left it, is of a pale green colour, much like the fresh tint of the wings of *Metrocampa margaritaria*.—J. C. Moberly, M.A., F.E.S., Woodlands, Bassett, Southampton. *November 20th*, 1900.

CURRENT NOTES.

Mr. H. J. Elwes and Miss Fountaine exhibited, at the meeting of the Ent. Society of London, October 3rd, 1900, a collection of lepidoptera from Greece, taken this season in the Morea and in the Parnassus region. Mr. Elwes remarked that the country about Athens was much dried up and overrun with goats and herds, and that, therefore, the lepidopterous fauna there was poor. On the south side of the Gulf of Corinth, however, the *Pieridi* were well represented, and out of eight European species seven were taken in three weeks. The spring and summer broods of *Pieris krueperi* this year were flying together—an unusual occurrence, possibly due to the rainy spring. Among other notable species, albinos of *Colias heldreichi* (female) were taken, *Gonepteryx rhamni* var. *farinosa*, and *Chrysophanus ottomanus*, while Mr. Elwes further expressed his opinion that a Lycænid taken and generally assumed to be a var. of *Nomiades semiargus* was a distinct species. Miss Fountaine mentioned in connection with these exhibits that *Colias heldreichi* swarmed on Mount Kelmos from 4000 to 7000 feet; and Mr. Elwes remarked that Miss Fountaine was the first British collector known to have captured this insect.

There is an old-world flavour about the record by Lieut.-Colonel Haworth-Booth (a grandson of A. H. Haworth, the renowned author of *Lepidoptera Britannica*), in the *Naturalist*, p. 300, of the capture of a disabled *Choerocampa porcellus* at Hull on July 17th last, the recorder observing that this is "according to Donovan (pl. ccexiv) one of the scarcest of the British Sphinges." Donovan must have written this at least a century ago, and the species is now known to be quite abundant in many parts of Yorkshire.

Entomologists will be grieved to learn that Auguste de Bormans has been obliged to give up work. For many years he held the unique position of being the only serious student of the *Forficularia*, upon which group he is the highest authority, but for some time past his health has been failing, and a serious illness in the summer has left his right side paralysed. His retirement will be a great loss to students, though his greatest work is at this moment in the press. His collection of *Forficularia* has been acquired in part by the British Museum, and in part by Mr. Malcolm Burr.

Brunner von Wattenwyl has published in pamphlet* form the main points of his great work "Observations on the colours of Insects."† In a handy little brochure, of 14 pages, with five plates, the author gives an outline of some of the more striking colour arrangements and patterns of the insect world. Though of course, less complete, especially

* "Die Färbung der Insekten," mit 5 Tafeln, von Karl Brunner von Wattenwyl (Vorträge des Vereines zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien, xxxix Jahrgang, Heft 11, Vienna, 1899.)

† "Betrachtungen über die Farbenpracht der Insekten," mit 9 Tafeln in Buntdrück, Leipsig, 1897. English Trans. by Edward J. Bles, B.Sc., King's College, Cambridge, 1897.

from an illustrative point of view, it is more convenient than the somewhat unwieldy proportions of the larger work. His remarks are very suggestive and well worth study.

In *Psyche*, vol. ix., p. 97, Scudder discusses the Orthoptera-fauna of New England. In his list of 1862, 78 species were included; to-day 98 are known. It is instructive to note that, of the names given in 1862, no less than three-quarters have been changed to suit the requirements of modern nomenclature. Only two earwigs are included, one is an accidental visitor, the other is *Labia minor*, L., now well-established, but doubtless originally imported from Europe.

Mr. McLachlan records (*Ent. Mo. Mag.*) *Bertkausia prisca*, Kolbe (a genus and species of *Psocidae* new to Britain), as being captured on a mossy boulder in the vicinity of Lynmouth. The specimen is somewhat large, apterous, the antennæ 13-jointed, the legs very long with 2-jointed tarsi. Mr. McLachlan also adds (*Ent. Mo. Mag.*), *Agrion hastulatum*, Charp., to the British list, the addition being based on a ♂ example taken by Colonel Yerbury at Aviemore on June 28th. The exact locality is "the backwaters of the Spey, between the bridge at Aviemore and the mouth of the stream which runs down from Loch an Eilan."

Mr. Saunders notes (*Ent. Mo. Mag.*) *Crabro carbonarius*, Dahlb., as an addition to the British list. This, too, was taken at Aviemore on June 28th by Colonel Yerbury. Mr. Saunders also adds (*Ent. Mo. Mag.*) *Nabis brevis*, Scholtz, to the list of British Hemiptera, a specimen being taken by sweeping, on low-lying, somewhat marshy ground, along the canal between Byfleet and Weybridge.

In the *Canadian Entomologist*, pp. 236 *et seq.*, Professor Fernald discusses the little-understood family—*Choreutidae*. He shows that the generic name *Hemerophila*, Hb. (with *pariana* as type) belongs to this group, *Simaethis*, Leach, and *Gauris*, Hb., falling as synonyms. He maintains *Choreutis*, Hb., with *myllerana*, Fab. (*scintilulana*) as type, and sinks *Porpe*, Hb., as being synonymous with *Choreutis*. He follows Guénée in maintaining *Orchemia*, Gn., for *diana*. For the other species he uses *Brenthia*, Clem., with *paronicella* as type, *Walsinghamia*, Riley, with *dira* as type, and *Setiostoma*, Zell., with *xanthobasis* as type. [Was not *Hemerophila*, Hb., proposed for the Geometrid—*abruptaria*?—Ed.]

We have received a most interesting brochure *Les Zygènes de la Normandie*, 1900, by L. Dupont. It gives a general review of our knowledge of the group, and a detailed account of the species inhabiting the territory dealt with—*Zygaena* (*Anthrocera*) *minos*, *Z. achilleae*, *Z. lonicerae*, *Z. trifolii*, *Z. palustris* (*trifolii-major*), *Z. filipendulae*, *Z. transalpina*, *Z. carniolica*, *Z. fausta*, *Z. hippocrepidis*, Stephens (*nec* Hübner). For the latter, in order to distinguish it from *Z.* var. *hippocrepidis*, Hb., M. Dupont suggests the name *Z. stephensi*. One is struck with the large number of species to be taken in Normandy compared with those found in Britain, a fact the more remarkable when one considers how similar Normandy is in many respects to some of our southern counties. It is a work to be obtained by all serious students of this intensely interesting superfamily, and is published at Elbeuf—Imprimerie-papeterie Allain, 1, 3, and 5, Rue St. Jacques.

Our readers will learn with regret that the veteran entomologist, Dr. Otto Staudinger, died on October 13th last at the age of 70. He

will be best known probably by his "Catalogue of the European Lepidoptera," of which the first edition was published in 1861, the second in 1871, whilst the third edition was at the time of his decease almost ready for press, and we understand that it is sufficiently forward for Dr. Rebel, who is responsible for the Micro-Lepidoptera, to publish without unnecessary delay. Dr. Staudinger was one of the pioneer lepidopterists who first worked little known districts of Europe and later sent collectors to those parts of Asia included in the Palæarctic area, and thus did much towards giving us a fairly complete knowledge of the fauna of outlying districts of the Palæarctic region. His descriptions of these collections, scattered through the *Romanoff Mémoires*, the *Stett. Ent. Zeitung*, the *Hor. Soc. Ent. Rossicae*, &c., are of the utmost importance, and his careful work and wide knowledge give them a special value, rarely obtained by others who have followed in his footsteps. From 1884-1888 he was largely occupied in the publication of his *Exotische Tagfalter in Systematischer Reihenfolger*, &c. During the latter part of his life, however, he has been an invalid, and his large business at Blasewitz has for some time been under the direction of his son-in-law, Herr Bang-Haas. We suspect no lepidopterist was so widely known or had so large a circle of correspondents.

The Yorkshire Naturalists' Union held its 39th annual meeting at Middlesborough, October 27th, the representatives of the Union being cordially welcomed to the town by Colonel Sadler, M.P., whilst the local arrangements under Mr. T. A. Lofthouse were everything that could be desired. The President, Mr. G. T. Porritt, F.L.S., F.E.S., occupied the chair. The officers for the ensuing year were elected, the Rev. W. Fowler, M.A., of Liversedge, being chosen President. Mr. Porritt then delivered an interesting address on the work of the Union, and a hearty vote of thanks was passed to the President for his address. The retiring President is to be heartily congratulated on such a successful year of office.

A most enjoyable meeting of the Entomological Club was held on October 31st, at Stanhope, The Crescent, Croydon, when Mr. T. W. Hall, F.E.S., was the host. Of the members, Dr. Mason and Mr. South were unable to be present, and Mr. Lowne appears never to accept now the invitations of his fellow-members. The members who sat down to supper with the host included Mr. G. T. Verrall, F.E.S., the genial President of the Entomological Society of London, Messrs. Porritt, F.L.S., F.E.S., and R. Adkin, F.E.S., and Mr. Smith, one of the honorary members, whilst among the guests were Dr. T. A. Chapman, Dr. Fremlin, Messrs. S. Edwards, A. Harrison, W. J. Kaye, W. J. Lucas, and J. W. Tutt. The meeting was of the usual informal character, and was largely devoted to gossip of current entomological subjects and to the examination of Mr. Hall's collection of lepidoptera.

We understand that by the time the December number of this magazine is published, Mr. Verrall's long expected work on the *British Diptera* will be obtainable from the publishers. A glance at occasional sections as the work has gone through press leads us to predict a great measure of success for this much-needed work.

Other examples of *Euranessa antiopa* recorded are as follows: Hatfield, October 10th, Huntingdon, August 19th, Beddington, August 31st (*teste* Frohawk), Holt, August 3rd (Woodhall), Beckenham, August

31st (Thompson), Bridgwater, three seen (Corder), Stutton Hall, September 4th (Nash), Merton, September 6th (Durrant), near Dunmow, one taken another seen, September 20th (Ruffel).

At the meeting of the Entomological Society of London, held on October 17th, 1900, Mr. A. J. Scollick exhibited a specimen of *Cethosia cyane*, a species confined to India and the Malayan region, which had been taken this year on the wing near Norwich. It was suggested by Mr. Distant that this was a case of accidental importation, probably in the pupal condition.

At the same meeting Mr. H. Rowland-Brown exhibited specimens of *Erebia glacialis*, taken this year on the Stelvio pass, showing transitional forms to the var. *alecto*. He said that the typical form and the variety were not found flying together, but on opposite sides of the valley. Dr. Chapman observed that the darker specimens approached to the form of *E. glacialis*, formerly known as *melas*, found in the neighbourhood of Campiglio. Specimens of *E. glacialis* also exhibited from Saas Fée and Evolena showed marked inferiority in size and brilliancy of colour.

Dr. Sharp records (*Ent. Mo. Mag.*) the capture of a new British dipteron, *Leucophenga* (*Drosophila*) *maculata*, Duf. The species has "the head between the eyes pure white; the thorax varies in colour according to the light—in some positions it appears to be brilliant white, and in others of a leaden hue; there is a pure white stripe on each side between the wing and the eye; the abdomen is pallid but each segment is marked with large black spots; the legs pale yellow." Mr. Grimshaw records the capture (by Mr. Ord, at Strathblane, on June 19th, 1899) of another new species, *Hyetodesia aculeipes*, Zett., easily distinguished from all other British Anthomyids "by the remarkable appendage with which the hind tibia of the male is furnished."

In *La Feuille des jeunes naturalistes*, November, 1900, pp. 12-17, M. Oberthür has a most interesting article "Variations des Lépidoptères de la Faune anglaise," with two plates. The author curiously understates the number of British students of the Palæarctic fauna—Mrs. Nicholl, Miss Fountaine, Drs. Chapman and Lang, Messrs. Brown, Jones, Buckmaster, Kane, Lemann, Nicholson, Leech, Lowe, Postans, Merrifield, &c., should surely be added to those mentioned.

In the *Ent. Mo. Mag.* for November, Dr. Sharp in recording Coleoptera collected by N. Annandale, Esq., in the Faroë Islands and Iceland describes a new species of *Bembidium*, *B. islandicum*, from the latter locality. In the same number Dr. Cameron records the re-occurrence of *Actocharis readingi* at Plymouth, in the same spot where *Trogophloeus anglicanus* was captured.

Mr. Edwards notes (*Ent. Mo. Mag.*) two Hemiptera not hitherto recorded as British, *viz.*, *Typhlocyba cruentata*, H.-Sch., taken in August last by Mr. E. Saunders on an old paling under sycamore trees at Clandon. (2) *Typhlocyba candidula*, Kirschb., found by Mr. W. West on white poplars at Blackheath, Lewisham, Lee, and Brockley. The Rev. Canon W. W. Fowler, adds *Orochares angustatus*, Er., to the British list. Its inclusion is based on a single insect taken by Piffard about twelve years ago, in November, hybernating at the roots of rushes in a disused clay pit at Bennett's End, Liverstock Green, Herts. It was at the time of capture verified by Mr. O. Janson but not recorded. Mr. Beaumont records a Braconid new to the British list, *viz.*, *Blacus armatulus*, Ruth., taken at Appledore.

Another meeting of the members of the Entomological Club and their friends was held at 4, Lingard's Road, Lewisham, S.E. on November 27th, Mr. R. Adkin being the host. The gentlemen present included Messrs. Verrall, Smith, McLachlan, C. G. Barrett, H. Rowland-Brown, S. Edwards, A. H. Jones, J. Jäger, W. J. Lucas, H. J. Turner and J. W. Tutt. Tea was provided at 6.30 p.m. by Mrs. and Miss Adkin, after which a most enjoyable evening was spent, supper being served at 8 o'clock.

At the meeting of the Entomological Society of London, held on November 7th, Mr. George S. Saunders exhibited specimens, from Devonshire, of *Pieris rapae* and *Plusia gamma* caught by the proboscis in flowers of *Araujia albens*, Don., a climbing plant of the natural order *Asclepiadaceae*; and explained the nature of the mechanism by means of which the insects were entrapped by the flowers. Mr. Gahan remarked in reference to the capture of insects by *Araujia albens*, that the statement met with in some books to the effect that insects were only captured by it in countries where the plant was introduced and not in its native country, was wrong. The specimens exhibited by Mr, Janson at a meeting of the Society last year, came from Buenos Ayres, one of its native places. The subject had recently been discussed in France by MM. Marchand and Bonjour, whose account appeared in the "Bulletin de la Soc. des Sciences Nat. de l'Ouest de la France," for 1899. These authors concluded that insects were captured only by immature flowers, the anther-wings, in the cleft between which the proboscis of the insect is caught, being at that time stiff and resistant; but when the flowers are ripe the anther-wings become less rigid and do not offer sufficient resistance to the withdrawal of the proboscis, which carries with it the pollinia ready to be transferred to the stigma of the next flower which the insect visits.

At the same meeting the Rev. F. D. Morice mentioned as a fact of some interest, that in a nest of *Formica sanguinea* at Weybridge, in which he found males and workers of that species, he found also males and females as well as workers of the slave-ant, *Formica fusca*, an experience somewhat different from that of Huber and Darwin, who stated that workers only, and never males nor fertile females of the slave species, were found in the nests of *F. sanguinea*.

The President of the Entomological Society of London at the meeting on November 21st suggested from the chair that Fellows living in or out of London should, by letter, communicate to the Secretaries the names of any Fellows that they considered should have a seat on the Council. He further stated that he would like to see the election of Council and Officers arranged so that the whole body of Fellows should take a more direct part in the election. The President further hinted that representative members residing out-of-town would be especially welcomed. To do this the number of Fellows serving on the Council should clearly be increased. There are at present only 15—of whom 5 are really fixtures, and 5 of the others have to retire each year. The specialisation of work makes it very necessary that the Council should be as representative as possible, but, at the same time, as the work of the lepidopterists is, at present, much more specialised than that of the students of any other order, and the Fellows who are lepidopterists outnumber the Fellows studying all other orders by about 5 : 1, some

general average of representation should if possible be devised. It is perhaps worthy of note that the average attendance at the meetings always appears to be higher when a lepidopterist is in the chair, and record meetings generally occur when Mr. Merrifield, Mr. Elwes, Dr. Dixey, Professor Poulton, or some well-known lepidopterist is on the warpath. The friendly selection of a long list of well-known Fellows by outsiders, that might be added to the list chosen by the Council, in order to obtain a popular election at the next general meeting might perhaps prove a step in the right direction.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

Eggs of Lepidoptera.—*Eubolia plumbaria.*—Length ·75mm., width ·5mm., height about ·25mm., oval in outline with a deep oval depression occupying almost the whole of the upper surface, pale yellow in colour, covered with a reticulation of large polygons (chiefly hexagonal) the lines of the network not very coarse. The base of the egg is equally reticulated with the sides, but the mesh of the reticulation becomes much smaller around the micropyle, which is placed centrally at one end, and consists of a stella of small radiating cells (Described July 20th, 1898, from eggs sent by Mr. Clutten).

Calligenia miniata.—Eggs laid on July 27th, 1898, at Aix-les-Bains, matured very rapidly, and by August 3rd were grey in colour, with the upper parts blackish-grey. This dark part under a lens proved to be the heads of the contained embryos which were already practically mature. The nine-pin-like appearance of the eggs of this species has been already referred to.

Melampias epiphron.—Pale yellow in colour; tall compared with width (3 : 2); the tranverse section circular; about 14 or 15 ribs from base, some not reaching the top, distinct, but not very sharp and no great depth between them, transverse ribbing very indistinct, the micropylar area flattened, the ribs appear to anastomose on the edge of the micropylar area, which although flattened is not depressed; base smooth, its shape forms a truncated cone, with the apical diameter almost as wide as the basal (Described August 12th, under hand lens from egg laid August 11th, by ♀ caught on the slopes above Villa, near Evolena, by Dr Chapman).

Aciptilia tetradactyla.—Long axis horizontal, length : breadth : : 3 : 2; laid on lid of box; pale-green in colour; almost regularly oval in outline, although rather broader at micropylar end; somewhat plump, surface apparently quite smooth, and no trace of a depression on upper surface; exceedingly minute, no means of judging size (Described with hand lens, August 2nd, 1899, from eggs laid same day by moth captured at Simplon).

Acidalia ptarcolaria.—Laid on its long side; very pale brownish, even when first laid, becoming slightly darker afterwards; broadly oval in outline; length : breadth : : 5 : 4; the ends somewhat flattened, one (micropylar) end appearing to be rather more so than the other; the upper surface slightly depressed, the whole surface covered with a fine polygonal network arranged in longitudinal ovals, the reticulation very marked (but not coarse as in *A. humiliata*), the hexagonal spaces deep owing to height of ribs; about eleven to width of egg and

fourteen to length, and so arranged that whether the egg be looked at from any position (but especially the upper or flat side), they appear to form concentric ovals which are less marked centrally (Described under hand lens, July 30th, 1899, from eggs laid same day at Simplon).—J. W. Tutt.

Late larvæ of Cerura furcula.—It may be of interest to state that at the end of last September I took four very small larvæ of this species on sallow. These I sleeved on some sallow growing in the garden. One of the larvæ died on October 22nd, after feeding up fairly well, and another on November 4th. The third I found on November 11th spun up, and the remaining larva, which I removed into the house on the last mentioned date as it appeared to have suffered somewhat from the effect of the frosts on the two previous nights, fed until November 18th, when, although apparently immature as regards size, it spun up, finishing its pupation on November 20th.—A. Russell, F.E.S., Southend, near Catford. *November 24th*, 1900.

REVIEWS AND NOTICES OF BOOKS.

Fauna Regni Hungariae.—III., Arthropoda, Orthoptera, pp. 1-47, and one map. Budapest, 1899.—This is a continuation of the monograph of the fauna of Hungary, which celebrates the thousandth anniversary of the establishment of the kingdom. The Orthoptera, *sensu stricto*, are by Julius Pungur. The literature quoted consists of a list of 122 papers, mainly in Magyar. The census of species is as follows:—*Forficularia*, 7 species; *Blattodea*, 11; *Mantodea*, 3; *Phasmatodea*, 2; *Acridiodea*, 59; *Locustodea*, 76; and *Gryllodea*, 15; making a grand total of 173 species. We notice that Pungur retains *Apterygida albipennis*, Meg., in the genus *Chelidura*, from which it must undoubtedly be removed, and also that he does not follow Scudder in restoring *Podisma* for *Pezotettix*. The most interesting species included is *Bacillus redtenbacheri*, Pad., a rare form, hitherto only known from Zengg, in Croatia. The *Thysanoptera* are worked out by Joseph Jablonowski, who records 37 species. Of *Apterygogonea*, by Emeric Vellay, there are 70, and of *Pseudo-Neuroptera*, by Alexander Mocsary, there are 148, distributed as follows:—*Termitidae*, 1; *Psocidae*, 21; *Perlidae*, 25; *Ephemeridae*, 42; *Libellulidae*, 22; *Aeschnidae*, 15; *Agrionidae*, 22. The true *Neuroptera* are treated by the same author, and 244 species are included in the list.—M. B.

British lepidoptera.—I am very glad to see the sympathetic note written by Mr. W. J. Kaye. upon the second volume of *British Lepidoptera* (*antea*, pp. 286-288). I, for one, should be very sorry to see the local lists cut down.—J. C. Moberly, M.A., F.E.S., Woodlands, Bassett, Southampton. *November 20th*, 1900.

Errata.—p. 286, line 9 from bottom, for "Praem" read "Praun." p. 274, line 3, for "Nov." read "Nor."

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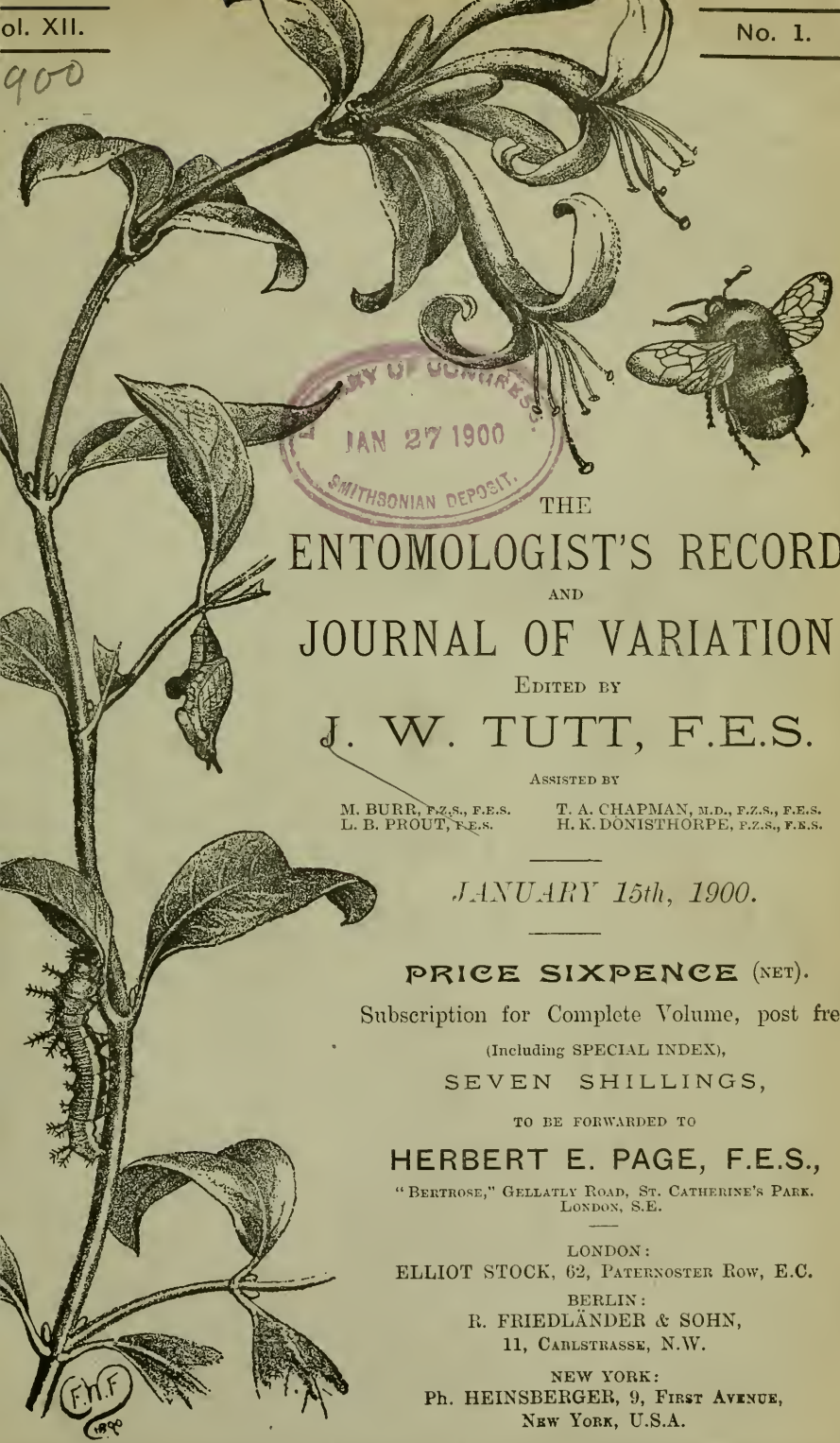

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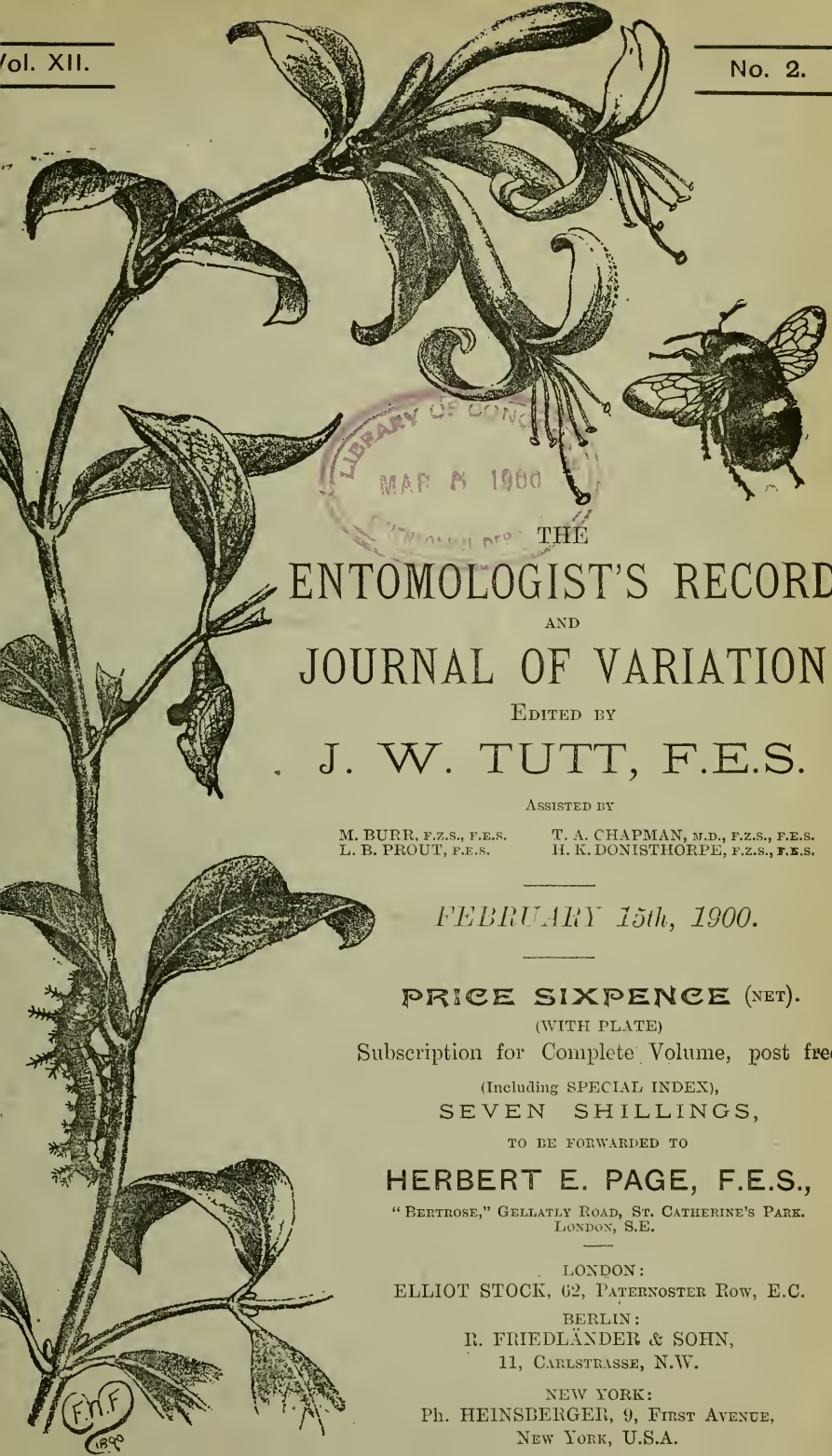

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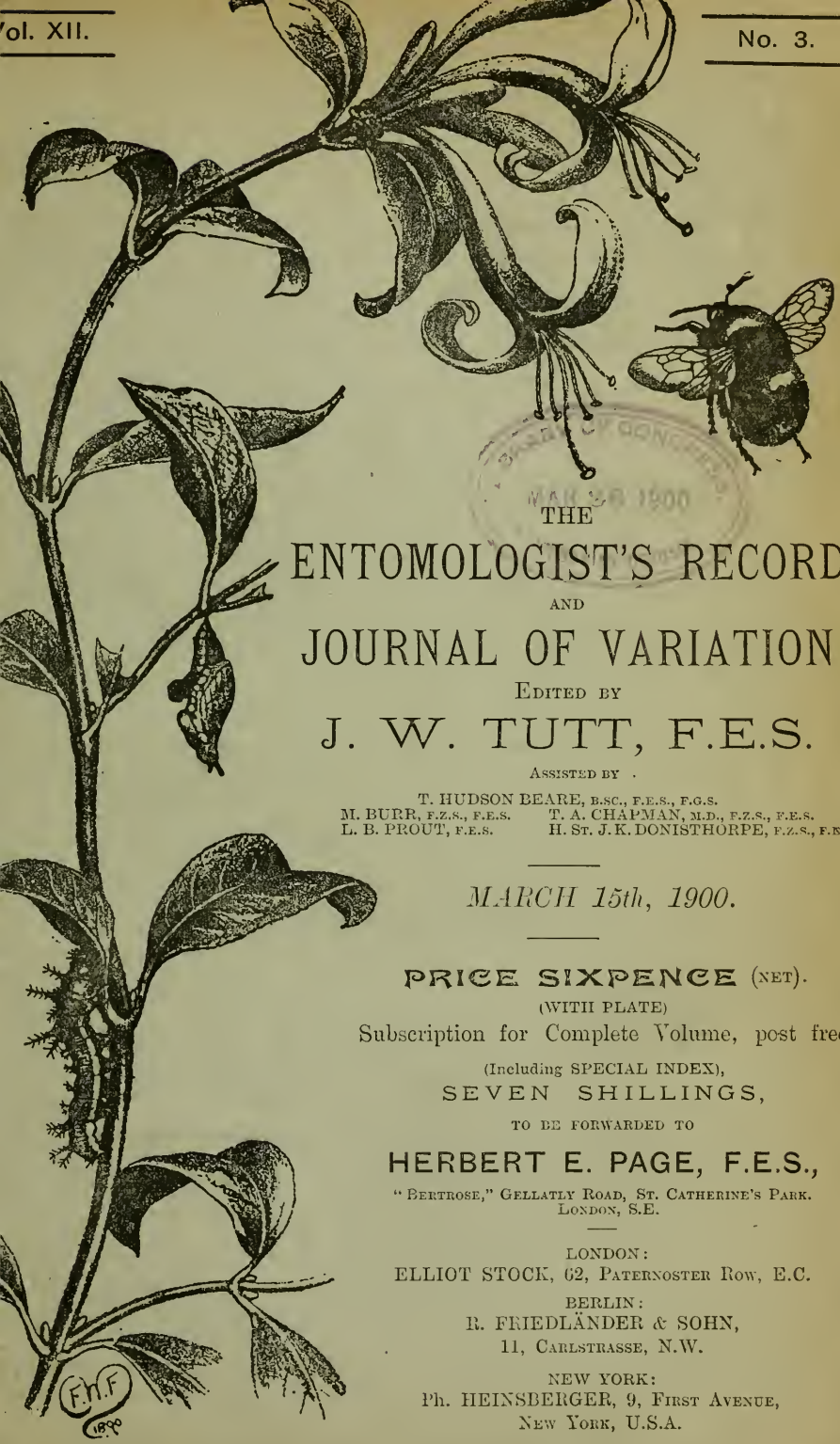

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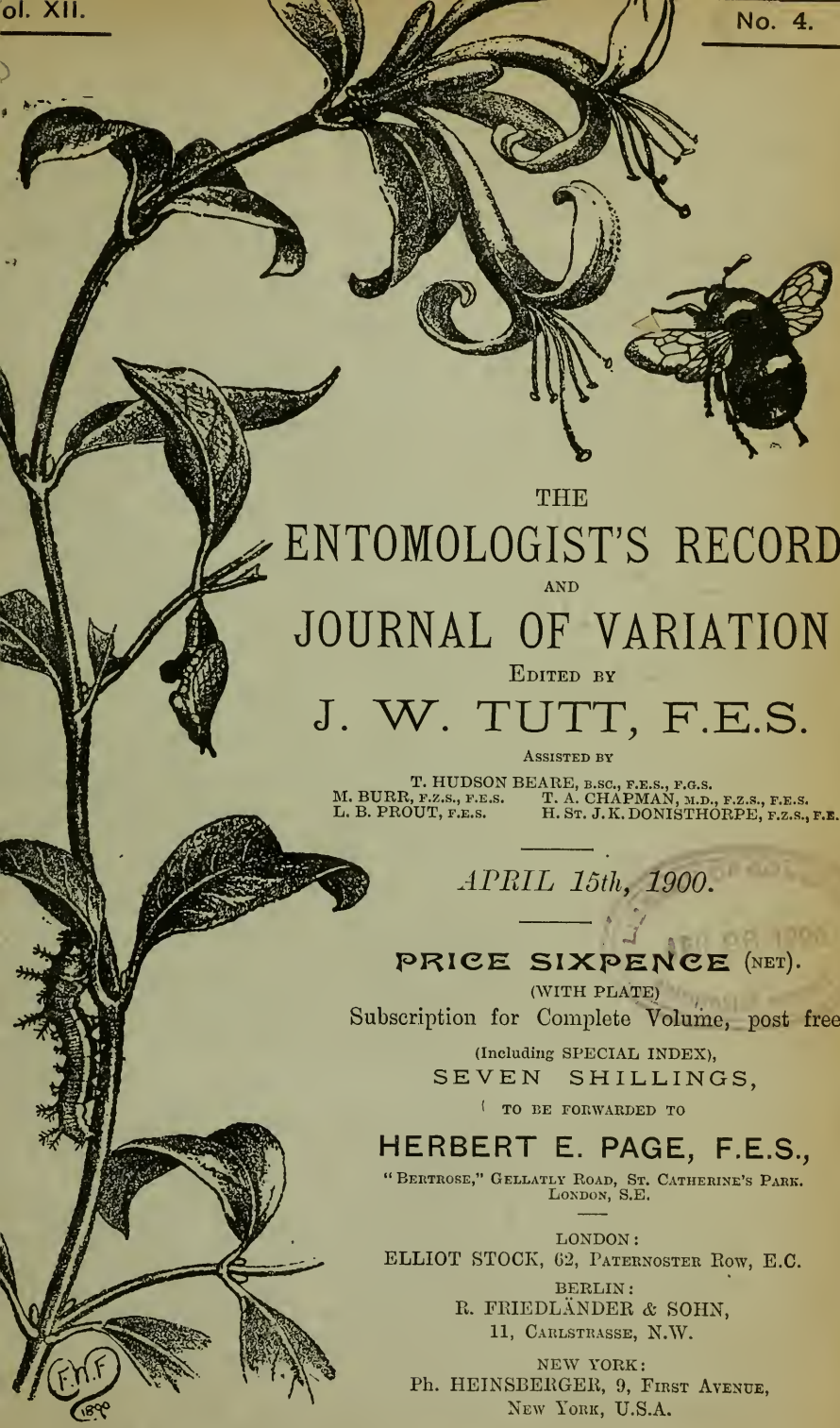

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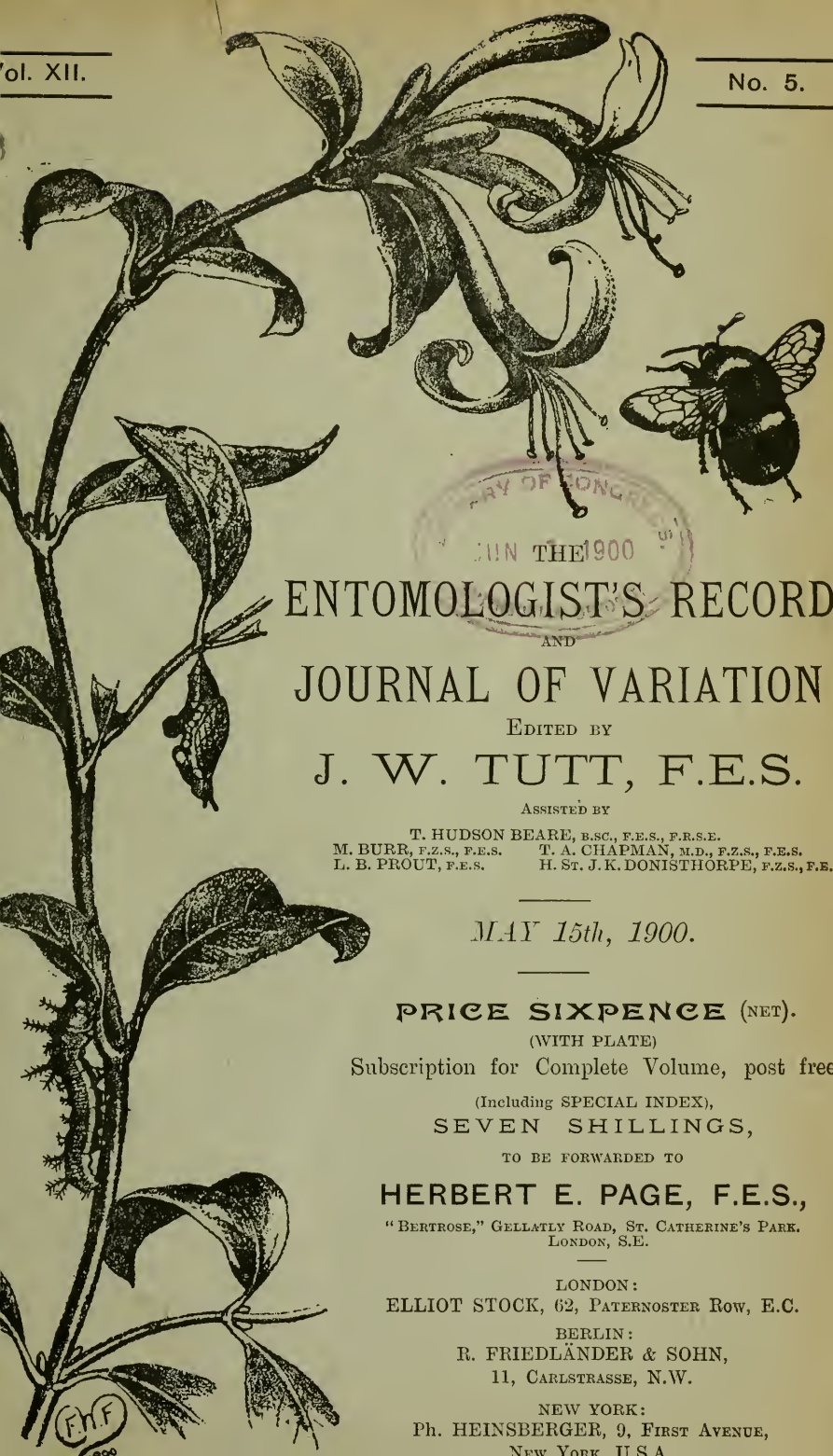

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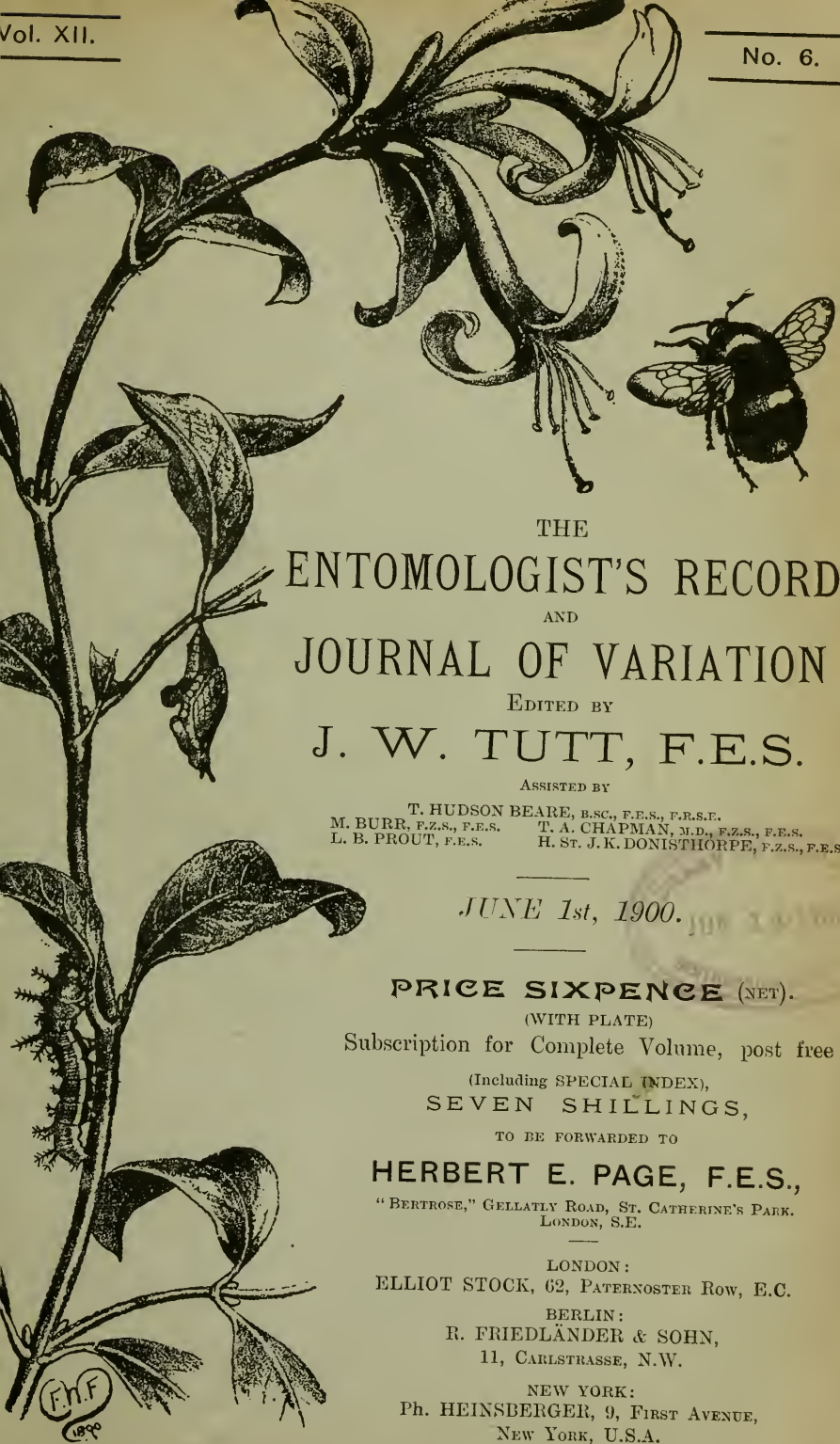

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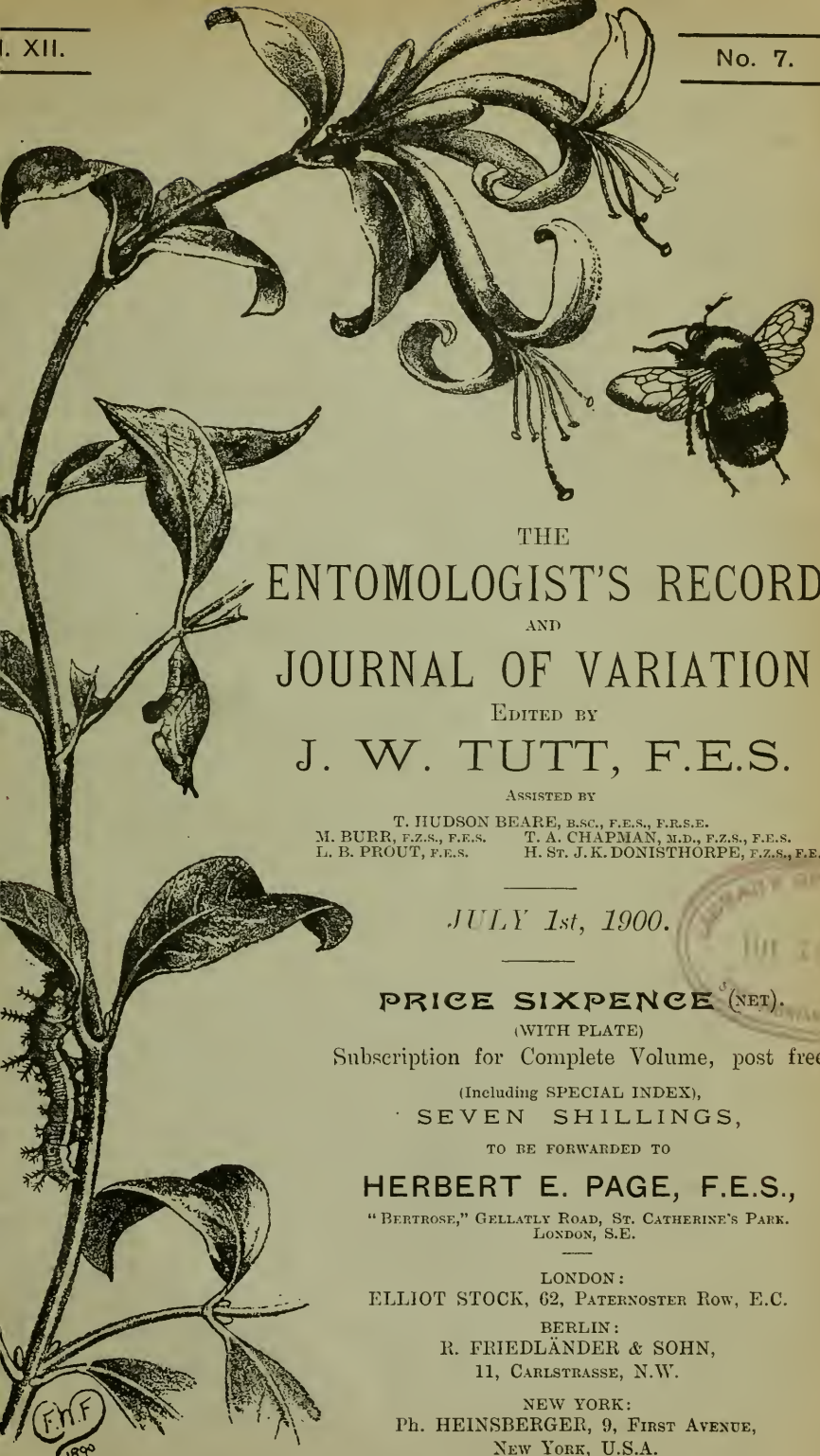

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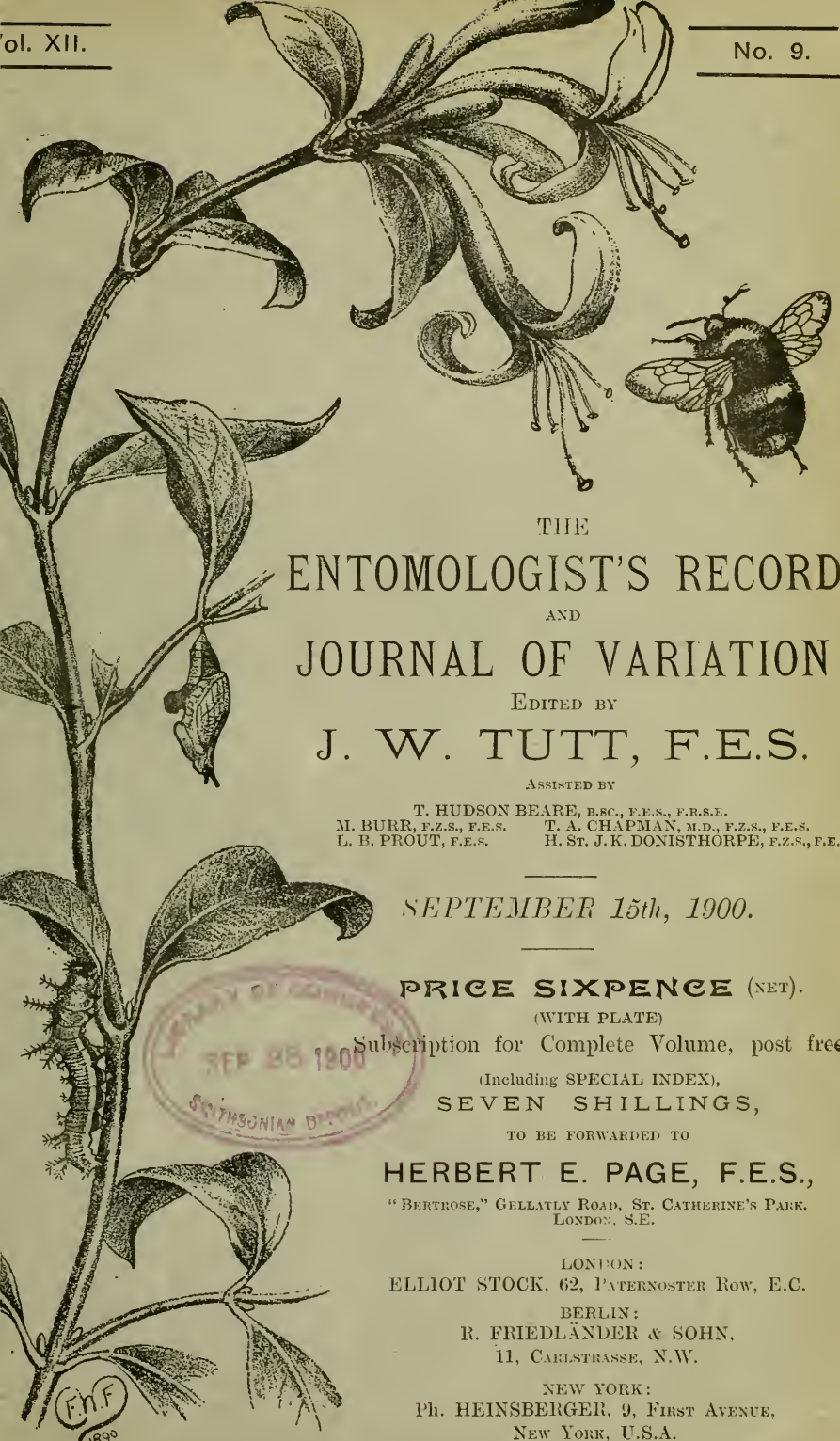

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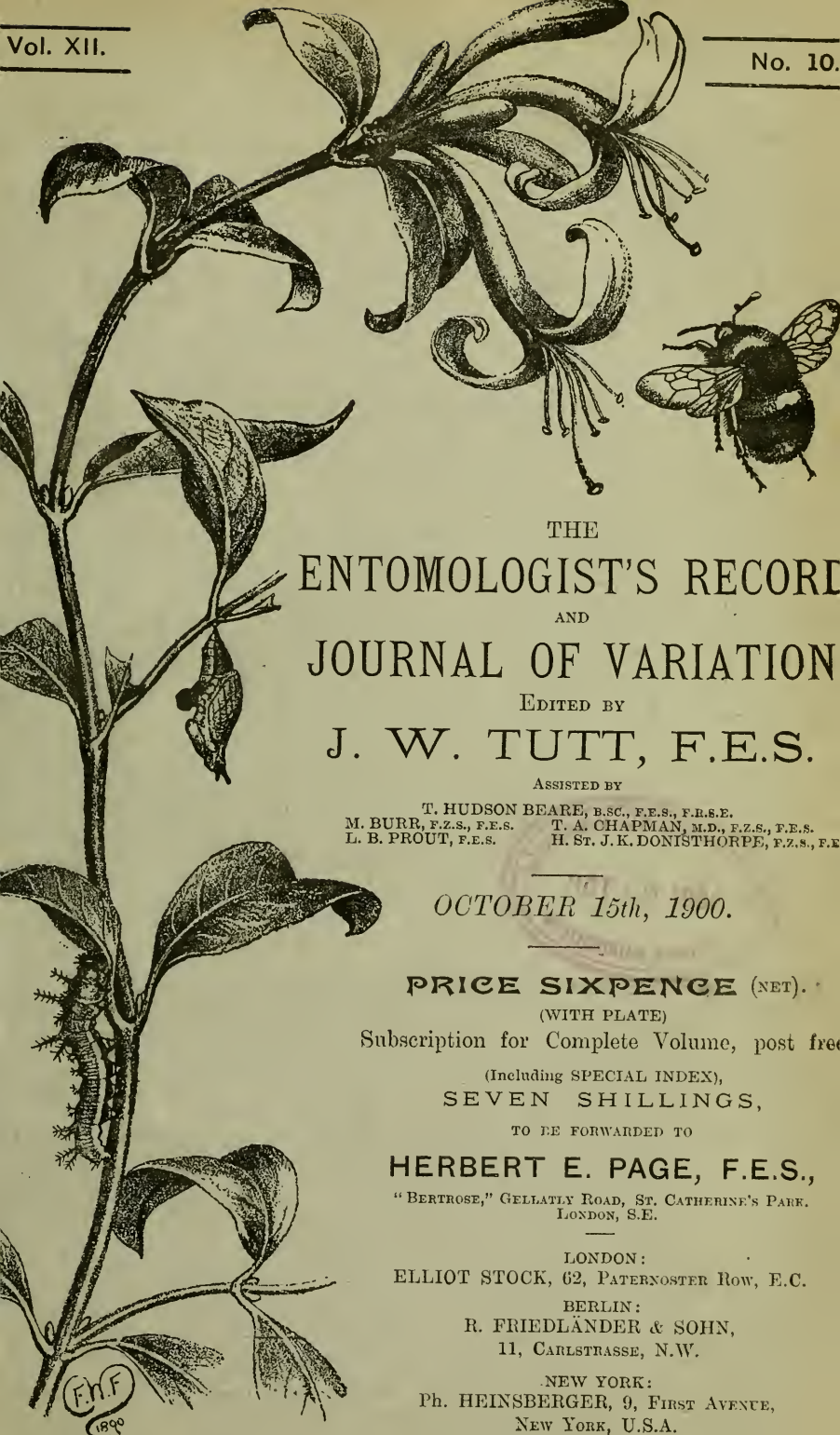

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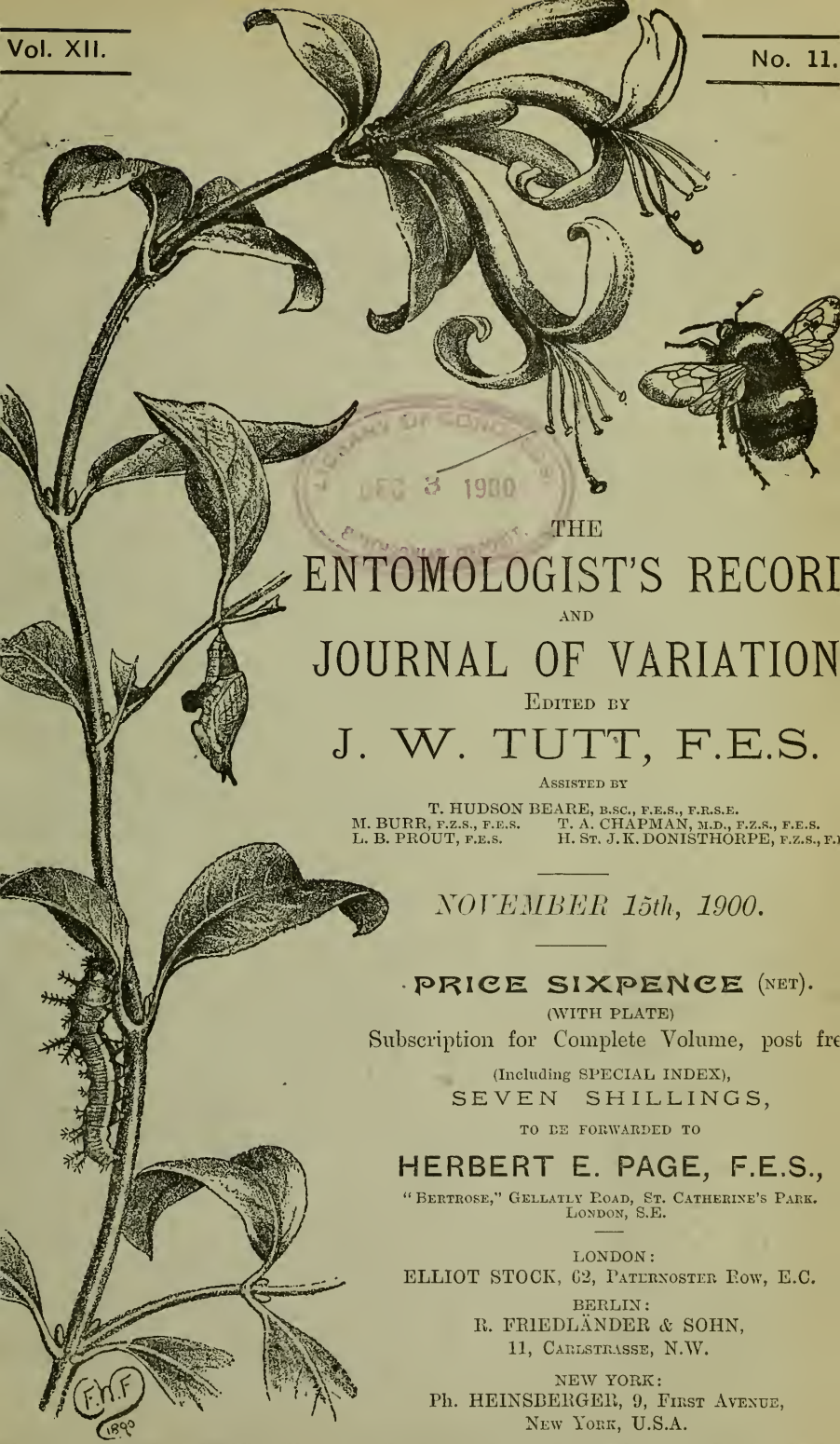

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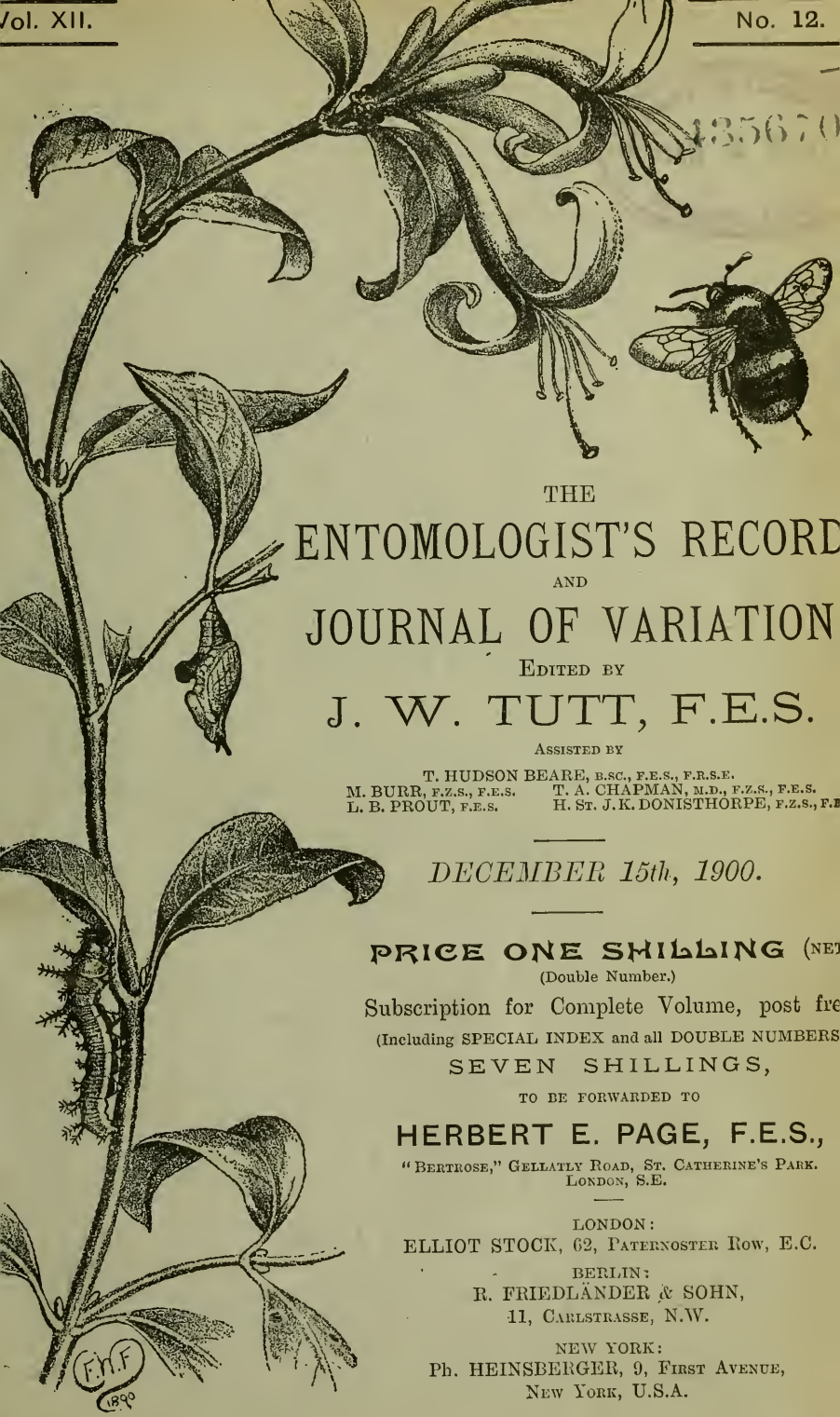

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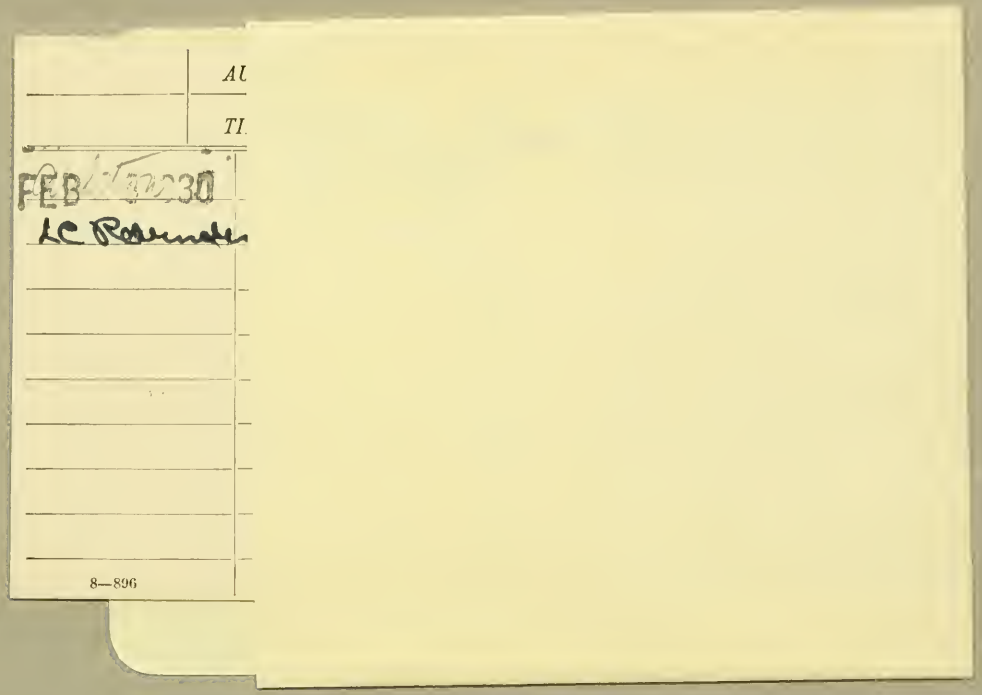
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